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Delays in Seeking, Reaching, and Access to Quality Cancer Care in Sub-Saharan Africa: A Systematic Review of the Literature

Dorothy Chilambe Lombe¹
Monde Mwamba²
Susan Msadabwe³
Virginia Bond²,⁴
Musonda Simwinga²
Andrew Sentoogo Ssemata⁵
Richard Muhumuza⁵
Janet Seeley⁴,⁵
Amos Deo Mwaka⁶
Ajay Aggarwal⁴,⁵

¹Regional Cancer Treatment Services MidCentral District Health Board, New Zealand ²Zambart, School of Public Health, Ridgeway Campus, University of Zambia, Lusaka, Zambia

³Cancer Diseases Hospital, Lusaka Zambia

⁴London School of Hygiene & Tropical Medicine (LSHTM) Keppel Street, London, WC1E 7HT

⁵The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit. P.O. Box 49 Entebbe

⁶Department of Medicine, Faculty of Medicine, Gulu University, Gulu, Uganda. ⁷Institute of Cancer Policy, King's College London, London SE1 9RT, UK

Keywords: sub Saharan Africa, cancer, delays, seeking care, diagnosis, treatment

Corresponding author: Dr Dorothy C. Lombe Email: dorothylombe@yahoo.com

Mobile: +64 21 148 3919

Abstract

Objectives

The cancer burden in sub-Saharan Africa continues to grow. Late presentation and delays translate into poor outcomes. We undertook a systematic review to present a summary of the barriers to cancer control in Sub-Saharan Africa using the three delays framework.

Methods

The search was conducted in PubMed and Embase for articles published between January 1995 and March 2021. The inclusion criteria were solid cancers, Sub-Saharan African countries, and quantitative or mixed method research published in the English language. The exclusion criteria were reviews, conference abstracts, pediatric and hematological cancers, and qualitative research papers.

Findings

Of the 6225 articles identified, 57 studies were included concentrated in Nigeria and Ethiopia. Breast and cervical cancer represented 70%. Most studies were conducted in the hospital setting using a cross sectional survey design. Major issues identified included 1. The indirect and direct costs associated with diagnosis and treatment, 2. Lack of coordination between primary, secondary, and tertiary health care sectors, 3. Inadequate staffing 4. Trust and reliance on traditional healers

Conclusions

Breast and cervical cancers are the focus of most research in SSA. Other high burden cancers are not addressed and this raises concern as the pathways to quality care across cancers is not homogenous. In addition, research continues to focus on 3 or 4 countries, and without greater evaluation of all systems and contexts, gaps will continue to widen. Cognizance of the multiple barriers from developing a cancer to treatment is important for policymakers and experts to build resilient and effective cancer control programs.

INTRODUCTION

The cancer control agenda has globally received a high level of political recognition. ^{1,2} In sub-Saharan Africa (SSA), with an age standardized incidence and mortality rate of 128.2 and 87.2 per 100 000 respectively, cancer is becoming a leading public health problem. ³ There is a growing emphasis that the successful translation of commitments to support cancer control policy into substantial reductions in cancer morbidity and mortality must occur on a locally adapted evidence-based platform but robust local research is lacking in contrast with developed nations.

Countries in SSA operate in an environment of low resources, which has resulted in cancer management largely focusing on those presenting with overt symptomatic disease.^{4,5} The system level challenges are heterogeneous across SSA but factors germane to all countries include limited health care financing, inadequate financial protection (universal health coverage), inadequate infrastructure development as well as the need for health systems to manage a dual burden of infectious disease and growing non-communicable diseases.^{5–8}

The lack of coordination and fragmented pathways in cancer care at all stages including prevention, symptom awareness, diagnosis, treatment, and post treatment care makes cancer hard to manage in developing nations and ultimately results in high levels of premature mortality. Interventions occur in silos within three distinct groups 1) across specific cancer types which are prioritized; 2) across prevention, treatment, and palliation; 3) across primary, secondary, and tertiary health care sectors. Additionally, building strong system linkages to coordinate cancer care across primary, secondary, and tertiary sectors within country are generally overlooked and this results in critical delays.

Fragmented pathways of care and research priorities are also reflective of the dependence on external international financial donors which tend to support their specific agendas perpetuating silos of development.^{10,11} This approach can be considered reductionist as it fails to consider the system and structural drivers of inequalities in access to diagnosis and treatment.

Evaluation of the unique social, economic, geographic, and cultural determinants for late diagnosis and poor treatment outcomes are imperative to provide locally generated evidence. This will ensure the effective implementation of national cancer control programs.^{12,13} These factors are not just context specific (e.g., country, region) but also tumour specific. An array of factors including access to care (distance and cost), quality of care, coordination of care across health care sectors, education and training, as well as intricate personal and community relationships (values, beliefs, socioeconomic parameters, gender) need to be interpreted in each situation and considered explicitly.

Empirical work has sought to identify the factors influencing cancer diagnosis and treatment delay. However, to our knowledge there have been no attempts to synthesize the available evidence from primary quantitative research undertaken in the SSA context to inform cancer control policies and identify gaps in the current research literature. Gaps would include country settings, tumour types, or at-risk populations which remain under-researched. In addition, robust study designs need to be employed to provide further insights as part of the system evaluation.

In this review, we used the 'Three Delays' framework to support the synthesis and classification of our research studies focusing on barriers to diagnosis and treatment. The Three delays framework has been used in other health conditions e.g. child and maternal health, and emergency medicine, however, to date it has not been applied to cancer care delivery. ^{15,16} The framework considers three contexts and three delays. The three contexts are the: Patient context (perceptions of disease, barriers to care, cost of illness); Provider context (care process quality and outcome evaluation, health care workers perceived system barriers); Community context (proximity and physical accessibility of services in the community). The three delays are: seeking care; reaching care; and receiving quality care¹⁷ Delay 1 seeking care: This is the delay in recognizing illness and deciding to seek appropriate medical help outside the home. Delay 2 reaching care: This is the delay in reaching an appropriate health facility. Delay 3 receiving quality care: This is the delay in receiving quality care after reaching the health facility. The interconnection in the delays can be seen in Figure 1.

We undertook a systematic review of the literature on sub-Saharan Africa to identify areas requiring further evaluation according to country, tumour type, and setting to target resources and interventions that reduce disparities.

METHODS

Information sources and search strategy

The literature search was conducted on 8th March 2021 in PubMed and Embase for articles published between January 1995 and March 2021, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance. The full search strategy and PRISMA diagram are available in Appendix 1 and Figure 2 respectively.

Eligibility criteria

The study included published articles in the English language that focused on solid cancers. The primary research was focused on SSA countries. Types of studies included quantitative (surveys, observational studies) or studies using mixed methods research methodologies. The quantitative studies had to include patients who had received a diagnosis of cancer.

We excluded studies that included paediatric populations, haematologic malignancies, as well assessments of public perceptions and awareness of cancer since the focus was on patients with a cancer diagnosis.

Selection process

We used the systematic review tool Covidence. ¹⁸ Two reviewers (DL and MM) screened the abstracts and full text articles independently with a third reviewer (AA) to resolve any conflicts. The two primary reviewers extracted and validated the entries independently before merging the outputs.

Data items

Data extracted included the year of article publication; country of study; demographic characteristics (age, gender, HIV status, education, marital status, employment, income level); country level setting; disease subsite; study design; type of delay investigated.

Assessment of risk of bias

Taking into consideration the heterogeneous nature of the available literature the risk of bias assessment at selection was based on the principles of a tool developed by Hoy et al.¹⁹ DL, AA and MM discussed the included studies over a series of virtual meetings exploring the validity of each of the included studies: external (population and sampling frame) and internal (direct participant data collection, acceptable subject definition, mode of data collection).

Patient and Public Involvement

Patients and members of the public were not involved in the design, conduct or reporting of the systematic review. We intend for patients to be stakeholders in the subsequent Delphi process that will utilize the results of this review.

RESULTS

Study selection

An initial search identified 6225 articles of which 193 underwent full text review (Figure 2). Fifty-seven studies were included in our final sample and data extracted.^{20–75} Figure 3 and Table 1 summarizes the characteristics of the included studies.

Country and setting profile

The majority of studies were conducted in Nigeria, 15 (26%), Ethiopia, eight (14%), and South Africa, 7 (12%). Five (9%) were undertaken in Uganda, four (7%) in Kenya, and three (5%) in Rwanda. Four (7%) studies were carried out in more than one country. Only 9% (n=5) of the studies were carried out at the national level. Of the remaining studies, two-thirds were conducted at the hospital level (n=38) and a quarter (n=14) were conducted at the regional level.

Research design

Two-thirds of included studies used a cross sectional survey design. The rest of the studies included analysis of patient-level data collected retrospectively (23%) or prospectively (11%). Case control and Delphi studies represented 4% of studies.

Tumour types

Breast cancer was the most studied tumour type for our research question (53%, n=29) followed by cervix (18%, n=10). 21% of studies (n=12) evaluated multiple tumour types whilst there were smaller studies on colorectal cancer (n=2) and Kaposi's sarcoma (n=1). There were

no eligible studies on other high burden diseases in SSA such as prostate cancer and esophageal cancer identified in the literature.

Participant population

Patients identified in a hospital setting were the target population in 48 out of 56 studies. In the other studies, the target populations were: patients and clinicians (n=3), clinicians only (n=1), a combination of clinicians, public health opinion leaders and NGOs (n=1), patients in a community setting (n=2), and patients and health facility administrators (n=1)

Three delays framework

We synthesized the empirical studies into the three delay areas. 37% (n=21) of the studies investigated all 3 delays whilst 42% (n=24) focused on 2 delays and 21% (n=12) on 1 delay. Table 1 outlines the referenced studies drawing forth the reasons identified as contributing s delay. 1 c. to each type of systems delay. Table 2 provides a summary of the three delays.

Table 1. Study characteristics

Table 1. Study characteristics					
First author name	Year	Cancer type	Country	Sample size	Study Design
Gebremariam ³¹	2021	Breast	Ethiopia	223	Retrospective
Zeleke ⁴³	2021	Cervical	Ethiopia	410	Retrospective
Mapanga ²⁸	2021	Lung	South Africa	27	Delphi process
Nakaganda ²⁶	2020	Multisite ¹	Uganda	359	Cross-sectional
Tesfaw ⁶⁰	2020	Breast	Ethiopia	426	Retrospective
Tesfaw ⁶²	2020	Breast	Ethopia	371	Cross-sectional
Reibold ²²	2020	Breast	Ethiopia	51	Cross-sectional
Knapp ⁵¹	2020	Breast	Nigeria	609	Retrospective
Leng ⁵⁹	2020	Multisite ²	Nigeria	186	Cross-sectional
Togawa ⁵²	2020	Breast	Namibia Nigeria Uganda Zambia	1518	Cross-sectional
Swanson ⁷³	2020	cervical	Uganda	268	Cross-sectional
Foerster ³⁷	2020	Breast	Uganda, Zambia, Namibia, Nigeria	1429	Cross-sectional
Dereje ⁴²	2020	Cervical	Ethiopia	212	Cross-sectional
Dereje ⁴¹	2020	Cervical	Ethiopia	231	Cross-sectional
Agodirin ⁷⁵	2020	Breast	Nigeria	420	Cross-sectional
Martin ²⁵	2019	cancer type not specified	Rwanda	73	Cross-sectional
Page ⁶³	2019	cervical cancer	Kenya	505	Prospective
Low ⁴⁰	2019	Multisite ³	Uganda	100	Cross-sectional
Wambalaba ⁶⁶	2019	Multisite ⁴	Kenya	1048	Retrospective
Grosse Frie ⁵⁴	2019	Breast	Mali	124	Cross-sectional
Yang ³⁸	2019	Breast	Tanzania	196	Cross-sectional
Schleimer ²⁴	2019	Breast	Rwanda	151	Retrospective
Foerster ⁵⁸	2019	Breast	Uganda Nigeria Namibia	1335	Prospective
Tapera ⁵³	2019	cervical	Zimbabwe	78	Cross-sectional
Agodirin ⁵⁷	2019	Breast	Nigeria	237	Cross-sectional
Rayne ³⁰	2019	Breast	South Africa	252	Cross-sectional
Subramanian ⁴⁹	2019	Breast	Kenya	800	Cross-sectional
Olarewaju ³⁹	2019	breast	Nigeria	275	Cross-sectional
Ajah ²⁷	2019	Multisite ⁵	Nigeria	95	Cross-sectional
Martei ⁵⁶	2019	Multisite ⁶	Botswana	286	Retrospective

Anakwenze472018Multisite7Botswana214Cross-sectionalMoodley502018BreastSouth Africa201Cross-sectionalJoffe 232018BreastSouth Africa499Cross-sectionalAwofeso672018Breast, CervicalNigeria105Cross-sectionalBhatia642018Multisite8Botswana214Cross-sectionalOladeji292017Multisite9Nigeria218Cross-sectionalJedy-Agba362017BreastNigeria316Case-controlAlatise552017colorectal cancerNigeria127Cross-sectionalCacala482017BreastSouth Africa172ProspectiveBrinton452016BreastGhana1184Cross-sectionalMlange612016CervicalTanzania202Cross-sectional
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Cacala ⁴⁸ Brinton ⁴⁵ 2016 Breast Cancer Cacala ⁴⁸ South Africa 172 Prospective Ghana 1184 Cross-sectional
Brinton ⁴⁵ 2016 Breast Ghana 1184 Cross-sectional cancer
cancer
Mlange ⁶¹ 2016 Cervical Tanzania 202 Cross-sectional
Tanzania 202 Cross sectional
Mwaka ⁷⁰ 2015 Cervical Uganda 149 Cross-sectional
Long ⁴⁴ 2015 Multisite ¹⁰ Cameroon 220 Cross-sectional
Pace ³⁴ 2015 Breast Rwanda 144 Cross-sectional
Tadesse ⁷¹ 2015 cervical Ethiopia 198 Cross-sectional
Dickens ⁷² 2014 Breast South Africa 1071 Retrospective
De Boer ⁶⁹ 2014 Kaposi Uganda 161 Retrospective sarcoma
Ntirenganya ⁶⁸ 2014 Breast Rwanda 6820 Cross-sectional Sierra Leone
Fasunla ⁴⁶ 2013 Sinonasal Nigeria 61 Cross-sectional Malignancies
Ibrahim ⁶⁵ 2011 cervical Sudan 197 Retrospective cancer
Anyanwu ²⁰ 2011 breast Nigeria 275 Retrospective
Otieno ³² 2010 Breast Kenya 166 Cross-sectional
Ezeome ³⁵ 2009 Breast Nigeria 164 Cross-sectional
Clegg-Lamptey ⁷⁴ 2009 breast Ghana 101 Cross-sectional
Ukwenya ³³ 2008 Breast Nigeria 111 Cross-sectional

^{1 -} Cervix, Kaposi's sarcoma, breast, prostate, esophagus; 2 - breast, cervical, head and neck, prostate; 3 - KS, cervical cancer, breast cancer, esophageal cancer, head and neck cancer, non-Hodgkin lymphoma, vulvovaginal, prostate, conjunctival squam cell ca, penile, melanoma; 4 - Cervix, Breast, Esophagus, Prostate, Ovary, Colon, Thyroid, Pancreatic, Lung, Liver; 5 - Cervical, ovarian, endometrial, vulva, choriocarcinoma, leiomyosarcoma; 6 - cervical, breast, prostate, esophageal, lung, uterine, ovarian, colorectal, head and neck cancers, Kaposi sarcoma; 7 - Cervical, breast, head and neck, vulvar, kaposi sarcoma, endometrial, penile, anal, esophageal, lymphoma, prostate; 8 - Cervical, Breast, Head and neck, Vulvar, Kaposi's sarcoma, Endometrial, Penile, Anal, Oesophageal, Lymphoma, Prostate; 9 - Uterine cervix, breast, head and neck, prostate, GIT; 10 - skin, breast, colorectal, gynecologic, anal

Tal	ole 2. Reasons for delays in 3 frame				
Da	for coaling core dalor.	Reasons for reaching care	Reasons for receiving quality care		
Ke	asons for seeking care delay	delay	delay		
•	Anticipated expense of	Dependence on others for	Absence of multidisciplinary		
	treatment	transport	team care		
	A set of set and the second set of the set of	Difficulty making	D		
•	Anticipated long waiting time at clinic	appointment or reaching	Burn out and disinterest of health		
_	Belief in witchcraft	doctor	care workers		
•	Bellet in witchcraft	DistanceEarlier alternative	Cancer not priority		
	Busy schedule	treatment	Chemotherapy stock outs		
	Denial	Family responsibilities	Communication barriers		
	Demai	High cost of prediagnostic	Communication barriers		
•	Distance	costs	Declining treatment		
•	Economic impact of taking time		Defaulting because of side effects		
	off work	High cost of transport	of drugs		
		Inability to afford clinic			
•	Embarrassment	visits	Diagnostic delay		
		Lack of knowledge of	Failure to come back for follow		
		estimated distance to	up diagnostic or treatment		
•	Family and friends' disapproval	nearest service	appointments		
			Failure to find accommodation as		
•	Fear of being asked to stop	Lack of money (for	outpatients close to treatment		
	habits e.g. smoking	transport)	centre		
_	Fear of death	Lack of navigation in	- Family commitments		
	real of death	primary careLack of needed caregiver	Family commitmentsFear of treatment (e.g.		
•	Fear of diagnosis	to accompany to facilities	mastectomy)		
	rear or alagnosis	Long investigation time at	muscecomy		
•	Fear of doctors	first contact	Fear of wasting doctor's time		
		Misdiagnosis at lower	S		
•	Fear of dying	levels	Few specialists		
•	Fear of job loss	Obligations at home	Financial incapability		
•	Fear of losing part of body (e.g.				
	breast)	Time restraints	High cost of medicines		
•	Fear of missing family				
	commitments because of	Turned away from clinics	High patient volume compared to		
	treatment	for arriving late	resources		
		Was told by health care			
	Foor of talling poonle of illness	worker there was no	Lack of consent		
•	Fear of telling people of illness	treatment for disease	Lack of consentLack of continuity of care by		
•	Fear of treatment	Work commitments	same healthcare workers		
	rear or treatment	- Work communicates	Lack of palliative care and		
•	Fear treatment is painful		counselling services		
	2		Lack of pathology and screening		
•	Financial incapability		services		

- Ignorance on available treatment
- Ignorance on how to seek healthcare
- Lack of awareness of symptoms
- Lack of personal initiative
- Lack of trust in health system
- Low education
- No health insurance
- No one to look after children
- Obligations at home
- Preference for alternative therapies (herbal, homeopathy, Chinese, acupuncture)
- Preference for care abroad
- Preference for food supplements/organic foods
- Preference for prayers and spiritual intervention
- Pregnancy/lactation/menopaus
- Prior bad experience at health centre of hospital
- Prioritising day to day survival over seeking help
- Putting others needs first
 - Secrecy
 - Stigma
 - Transport challenges (e.g. cost)
 - Travelled away from home**(out of comfort zone)

- Lack of smoking cessation clinics
- Lack of specific appointments with specialists
- Language barrier
- Long appointments, waiting periods
- Management of pregnancy
- Misdiagnosis
- No bed space
- No relative to care for them during treatment
- Not healthy enough to continue treatment
- Patients changing mobile numbers so cannot be contacted for further management
- Paying out of pocket expenses
- Poor collaboration amongst health care workers
- Poor nutrition
- Poorly trained staff
- Power outages
- Pre-referral diagnosis not communicated
- Preference for alternative therapies (herbal, Chinese, acupuncture, food supplements)
 - Preference to observe
 - Surgeon/operating room unavailability
 - Unavailability of treatment modality
 - Unwelcoming, demotivated and uncommitted staff turn patients away

Seeking delay

Reasons for delays in seeking care included a lack of awareness about cancer and low health literacy which manifested itself as fears, false perceptions and beliefs and embarrassment about cancer. ^{23,25,28},^{29,32},^{34,35,37,39,39},^{41,48},^{52,55},^{57,61},⁶²,^{64,67},⁶⁸,⁷⁰,^{74,75} There was also a preference for faith-based healers. 24, 27, 29, 32seeking treatment from traditional or 35,39,41,43,45,46,48,52,54,55,62,67,68,74,75 Participants in the various studies recounted the belief they had not been sick enough or didn't have adequate money to justify abandoning their obligations (both financial and social)^{23,24,26,28,34,35,39,42,48,49,52,53,55,69,74,75}; they rather reassured themselves about the seriousness of symptoms (for example lumps) as the symptoms did not cause disability or pain in the early stages of disease and that it was self-limiting. 23,28,33-35,39,41,44,48,50,64,70,75 Additionally, not knowing where or how to enter the health system for symptoms before they cause life threatening conditions contributed to delays in seeking treatment.^{28,34,41,43} The unknown costs of managing cancer was also noted to intimidate patients and delay presentation as a result.23,41

Reaching care

The physical distance to appropriate care was cited as a major barrier for patients who have to take into consideration transport costs to specialist facilities, accommodation and subsistence costs. ^{20,24–26,29,30,34,37–39,44,47–49,52,53,57,59,68–70,74,75} Even when transport is made available, they carry the cost of being away from their jobs and families. Other than geographical distance, low levels of cancer care knowledge amongst primary level healthcare staff was also a barrier to the referral of patients. ^{28,34,42,67,71,75} This was identified as a source of misdiagnosis and underlay the lack of recognition for the urgency of transferring care to tertiary institutions. In one study, participants reported that they had been misinformed at the primary level that their condition was incurable.

Receiving quality care

The paucity of infrastructure, equipment, medication, and human resources needed for cancer care underpinned the barriers to receiving quality cancer care. ^{25,59,66} Other factors included demotivated and burnt-out staff and the lack of specialist training of staff in cancer. ^{22,25,28,29,35,53,59} Tensions and mistrust of the system as a whole between the patients and healthcare providers operating in constrained environments were reported as contributing factors that drove patients to alternate medicine or even simply abandon treatment. ^{28,44,49} In addition, the lack of availability of essential resources lead to high prices and catastrophic out of pocket expenses for the patients. ^{20,26,28,29,33,39,44,46,49,52,53,58,59,73,74}

Discussion

The impact of delays in the cancer care pathway on persistent high mortality rates are well recognized. Sub Saharan African countries are called upon to accelerate the establishment and implementation of their cancer control plans and it is pertinent to recognize that whilst respecting the unique aspects of each nation, utilization of a common knowledge base avoids duplication and allows for prudent efficient use of scarce resources. ^{2,13} In this regard, results from research using a robust methodological approach provides a foundation for common knowledge that is applicable broadly. ¹⁴

Interpretation

Our systematic review of studies in Sub-Saharan Africa investigating the barriers to access to cancer care demonstrates a very limited number of studies despite the importance of this subject area, with heterogeneity in study design which limits their translational impact. The publications we found were clustered in the Northern and West African regions and given the heterogenous factors influencing the SSA region data cannot reliably be extrapolated across the continent. In addition, 70% of the studies focused on breast and cervical cancer with major causes of cancer related mortality and morbidity such as prostate and esophageal cancer not addressed which is of major concern. The results highlight the need for a coordinated approach to managing these evidence gaps with no studies addressing the barriers to diagnosis and treatment of cancer identified in 35 of 48 countries in SSA.

The capacity to conduct robust research is increasingly possible across countries in SSA but it requires considerable efforts to coordinate these resources to support a common agenda based on country and regional level priorities.^{76,77} Presently, a discordance between research needs and research funding priorities across the continent has been accelerated by the synthetic external agendas in individual countries rather than supporting endogenous solutions driven by those experiencing the problems.^{78,79}

Most published data have been obtained through cross sectional surveys, which detail the prevalence of reasons for delays but fail to provide sufficient insights into the underlying factors and system level processes to enable the identification of interventions. Nonetheless they still provide a valuable baseline that we integrated into a "Three delays" model.

The common roots of the reasons for delays at each level of seeking, reaching, and receiving quality care as listed in Table 2. are firstly fear (apprehension or mistrust) and secondly, a lack of resources (financial, human, or infrastructure). Across all delays, cost is a major factor that influences the interval between the stages in the cancer pathway. Out of pocket expenses are high with patients requiring cover for transport, accommodation, diagnostic tests, and medicines. A significant number of patients live under the poverty line and it may seem unrealistic for the families to spend on what is perceived to be an incurable disease in the first instance. A recent study demonstrated the threat of catastrophic health expenditure that accompanies a cancer diagnosis even with the basic drugs in Low and Middle Income Countries (LMICs).

In seeking care, fear is compounded by the lack of awareness (knowledge) of the disease, availability of services, or how to navigate the pathways to quality healthcare. It can drive patients to rely on familiar systems of alternative medicines (traditional healers, 'Chinese' medicine, Faith based healers). In addition to these challenges taking time off from work or domestic obligations to attend healthcare, appointments is often relegated in terms of priorities due to financial and social implications. Societal expectations also create fear of stigmatism and promote secrecy that hinders free information flow between those seeking it and its custodians.

For reaching care the lack of adequate coordination of services was the dominant theme. Poorly trained staff or lack of support for primary health care practitioners delayed referrals to more specialized services and the health system in such a scenario could discourage

patients on the curability of the condition. Links and relationships are essential between primary and secondary/tertiary healthcare as most patients will present first to local clinics or health posts. This is particularly important where systems are not electronically linked for results to be easily attainable between practitioners.

To receive quality care, patients need access to a health care system with appropriate human resources and infrastructure (diagnostic and treatment). A lack of human resources encompasses both the competence of the workforce for tertiary services as well as the actual low numerical value of specialized knowledgeable staff leading to burnout. Equally a skilled and competent workforce without appropriate infrastructure or sufficient medication and surgical supplies cannot be expected to deliver quality care. Another aspect to consider for receiving quality care includes patient factors like good nutritional status, financial capacity, and social capital to undergo treatment.

The findings from our study suggest that reasons for delays are interlinked both at an individual level and population level (Figure 1). An individual with vulnerabilities at the seeking level phase would most likely experience repetitive barriers in reaching care as well as receiving quality care. An underdeveloped health system with poor linkages between primary health care and tertiary level care will inevitably have a large proportion of patients falling through the cracks between phases of care. This could be due to untimely referrals and the inability to support diagnostic costs thereby relying on the patient to raise funds.

To see a reduction in cancer mortality in Sub Saharan Africa health systems need to address delays within the cancer pathway from initial presentation and appraisal to completion of treatment and managing follow up and the survivorship pathway. Holistic support for the patient as well as the workforce across the continuum and longitudinally in each phase is important to achieve good outcomes. Cognizance of the multiple barriers present for individual patients from developing a cancer to its treatment is important for policy makers and experts to build resilient and effective cancer control programs. With an individual in mind, an effective population approach can be achieved.

Limitations of this systematic review

This systematic review only captured literature in the English language. This means data and experiences of French, Portuguese and Spanish speaking SSA were excluded based on language. The survey and retrospective design of most of the studies introduced the inherent biases of these methodologies.

Implications for policy in SSA

Due to the paucity of organized data in SSA, the starting point of research is often extrapolated from other regions that have different realities. In carrying out this systematic review we provide an organized pool of information that will provide a robust resource for other researchers seeking to conduct studies in SSA.

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Author contributions

Conceptualization: DCL, AA; Data curation: DCL, MM, AA; Formal Analysis: DCL, AA, MM, SM; Funding acquisition: AA; Investigation: DCL, MM, AA; Methodology: DCL, AA; Project administration: AA; Resources: DCL, AA; Supervision: DCL, AA; Validation: DCL, AA, MM; Visualization: DCL; Writing- original draft DCL, SM, MM, GB, MS, RM, ASS, JS, ADM, AA; Writing – review and editing DCL, SM, MM, GB, MS, RM, ASS, JS, ADM, AA

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Data availability

All data is available in the Covidence app and access can be shared on request.

Ethics approval

Not applicable

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Figure 1. Linkages of 3 delays framework

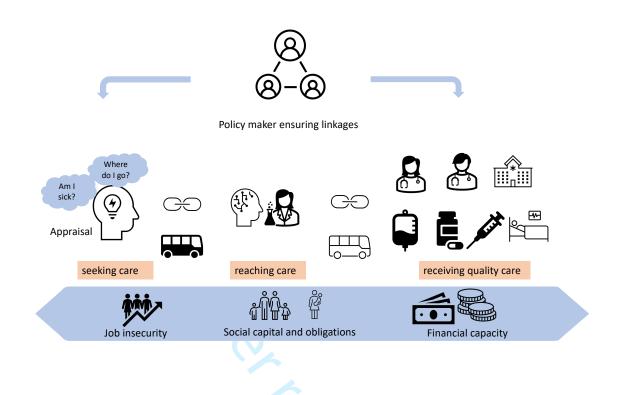




Figure 2. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)

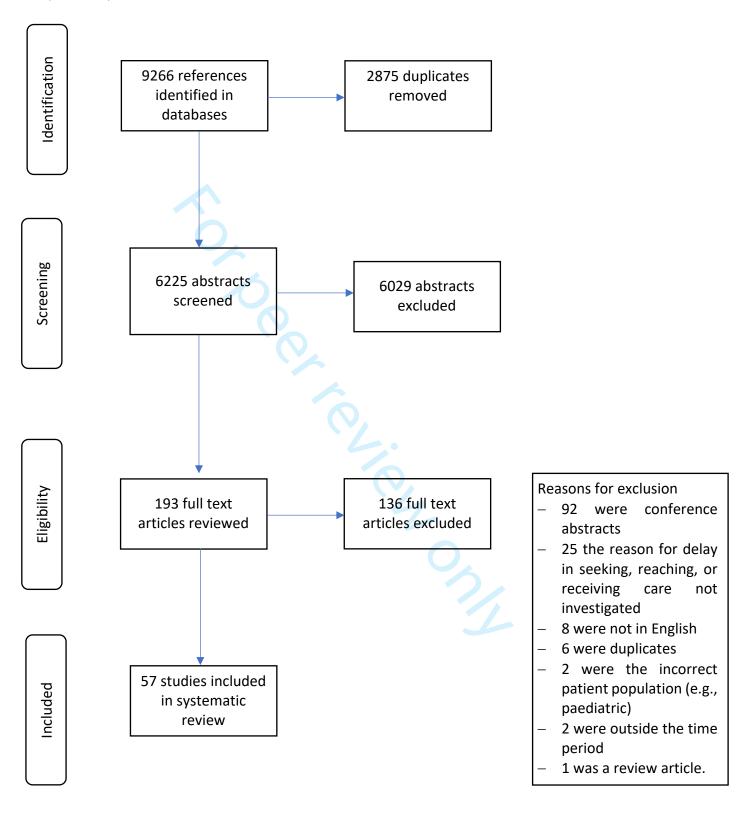
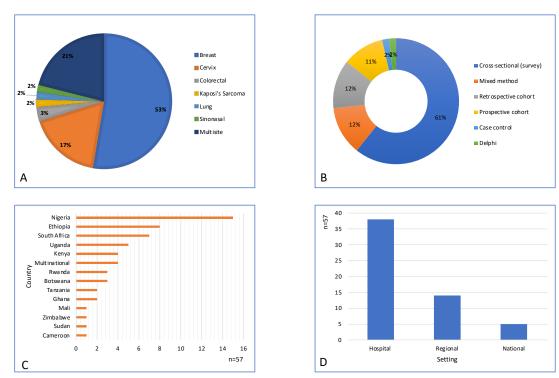


Figure 3. Descriptive characteristics of included studies n= 57, categorized according to A (Tumour type); B (Research design); C (Study country (ies); D (Study setting).





PRISMA 2020 Checklist

3				
Section and Topic	Item #	Checklist item	Location where item is reported	
TITLE				
7 Title	1	Identify the report as a systematic review.	Page 1	
ABSTRACT				
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Page 2	
INTRODUCTION				
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Pages 2-4	
3 Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Page 4	
4 METHODS				
5 Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Page 5	
f Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	Page 4	
§ Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix 1	
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Page 5	
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	Page 5	
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Page 5	
27	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Page 5	
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Page 5	
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	N/A	
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Page 5	
34 35	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	N/A	
36	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	N/A	
57 18 19	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	N/A	
10	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	N/A	
11	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A	
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	N/A	
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome in the body of evidence for an outcome in the body of evidence for an outcome.	N/A	



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	Page 5
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	N/A
Study characteristics	17	Cite each included study and present its characteristics.	Page 5 Table 1
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	N/A
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Page 6-7
Results of	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Page 6-7
syntheses	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	Page 6-7
) 1	20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
,	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	N/A
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	N/A
DISCUSSION	•		
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Page 7-9
•	23b	Discuss any limitations of the evidence included in the review.	Page 9-10
•	23c	Discuss any limitations of the review processes used.	Page 9-10
	23d	Discuss implications of the results for practice, policy, and future research.	Page 10
OTHER INFORMA	TION		
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	N/A
protocor	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	N/A
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	Page 11
Competing interests	26	Declare any competing interests of review authors.	Page 11
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Page 11

44 From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 45 10.1136/bmj.n71For more information, visit: http://www.prismassiateviewt.org/ - http://bmjopen.bmj.com/site/about/guidelines.xhtml

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Delays in Seeking, Reaching and Access to Quality Cancer Care in Sub-Saharan Africa: A Systematic Review of the Literature

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Delays in Seeking, Reaching and Access to Quality Cancer Care in Sub-Saharan Africa: A Systematic Review of the Literature

Corresponding author:

Dr Dorothy Chilambe Lombe

Postal address: Gate 2, Heretaunga Street, Private Bag 11036, Palmerston North 4442.

Email: dorothylombe@yahoo.com

Dorothy Chilambe Lombe¹
Monde Mwamba²
Susan Msadabwe³
Virginia Bond²,⁴
Musonda Simwinga²
Andrew Sentoogo Ssemata⁵
Richard Muhumuza⁵
Janet Seeley⁴,⁵
Amos Deo Mwaka⁶
Ajay Aggarwal⁴,⁵

¹Cancer Screening, Treatment and Support MidCentral, New Zealand

²Zambart, School of Public Health, Ridgeway Campus, University of Zambia, Lusaka, Zambia

³Cancer Diseases Hospital, Lusaka Zambia

⁴London School of Hygiene & Tropical Medicine (LSHTM) Keppel Street, London, WC₁E 7HT

⁵The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit. P.O. Box 49 Entebbe

⁶Department of Medicine, Faculty of Medicine, Gulu University, Gulu, Uganda.

7Institute of Cancer Policy, King's College London, London SE1 9RT, UK

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Abstract

Objectives The burden of cancer in sub-Saharan Africa (SSA) continues to grow. Late presentation and delays in diagnosis, and treatment, consistently translate into poor outcomes. The aim was to amalgamate the factors influencing diagnostic and treatment delays of adult solid tumours in SSA

Design and settings We undertook a systematic review of the literature to present a summary of the barriers to optimal cancer control in SSA using the three delays framework. **Methods** The search was conducted in PubMed and Embase for articles published between January 1995 and March 2021. We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance. Inclusion criteria were all solid cancers, SSA countries, quantitative or mixed method research and publications in the English language. Quality of studies was assessed with ROBINS-E tool.

Findings 57 studies were included. 40% from Nigeria and Ethiopa. Breast and cervical cancer represented 70%. Most studies were conducted in the hospital setting. Forty-three studies were evaluated having a high risk of bias at preliminary stages of quality assessment. Fourteen studies met the criteria for full assessment and all totaled to either high or very high overall risk of bias across 7 domains. The major issues identified included the indirect and directs costs; lack of coordination between primary, secondary and tertiary health care sectors; inadequate staffing and trust and reliance on traditional healers.

Conclusions Robust methodological research to inform policy on the barriers to seeking, reaching and receiving quality cancer care in SSA is absent. The focus of most research is on breast and cervical cancer. Research outputs are concentrated in few countries Multiple barriers are present for individual patients from symptom appraisal of cancer to its treatment. It is imperative that we investigate the complex interaction of these factors to build resilient and effective cancer control programs.

Strengths and limitations of this study

- The study interrogated 2 layers of factors (context and delays) by considering the '3-Delays Framework'
- The study conformed to the appropriate methodology of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance
- The quality of the studies included studies was largely poor but rigorous assessment of risk of bias across 7 domains allowed deduction key study findings that are a useful steppingstone for further investigation

INTRODUCTION

The cancer control agenda has globally received a high level of political recognition.(1,2) In sub-Saharan Africa (SSA), with an age standardized incidence and mortality rate of 128.2 and 87.2 per 100 000 people respectively, cancer is becoming a leading public health problem.(3) There is growing emphasis that the successful translation of commitments to support cancer control policy into substantial reductions in cancer morbidity and mortality must occur on a locally adapted evidence-based platform but robust local research is lacking in contrast with developed nations.

Countries in SSA operate in an environment of low resources, which has resulted in cancer management largely focusing on those presenting with overt symptomatic disease.(4,5) The system level challenges are heterogenous across SSA but factors germane to all countries includes limited health care financing, inadequate financial protection (universal health coverage), inadequate infrastructure development as well as the need for health systems to manage a dual burden of infectious disease and growing non-communicable diseases.(5–8)

The lack of coordination and fragmented pathways in cancer care at all stages including prevention, symptom awareness, diagnosis, treatment and post treatment care makes cancer hard to manage in developing nations and ultimately result in high levels of premature mortality.(9) Interventions occur in silos within three distinct groups 1) across specific cancer types which are prioritized(10); 2) across prevention, treatment, palliation(11); 3) across primary, secondary and tertiary health care sectors(12). Additionally, building strong system linkages to coordinate cancer care across primary, secondary and tertiary sectors within country are generally overlooked and this results in critical delays.(9)

Fragmented pathways of care and research priorities are also reflective of the dependence on external international financial donors which tend to support their own specific agendas perpetuating silos of development.(13,14) This approach can be considered reductionist as it fails to consider the system and structural drivers of inequalities in access to diagnosis and treatment.

Evaluation of the unique social, economic, geographic and cultural determinants for late diagnosis and poor treatment outcomes are imperative to provide locally generated evidence. This will ensure the effective implementation of national cancer control programs.(15,16) These factors are not just context specific (e.g., country, region) but also tumour specific. An array of factors including accessibility to care (distance and cost), quality of care, coordination of care across health care sectors, education and training, as well as intricate personal and community relationships (values, beliefs, socioeconomic parameters, gender) need to be interpreted in each situation and considered explicitly.

Empirical work has sought to identify the factors influencing cancer diagnosis and treatment delay.(17) However, to our knowledge there have been no attempts to synthesize the available evidence from primary quantitative research undertaken in the SSA context to inform cancer control policies and identify gaps in the current research literature. Gaps would include country settings, tumour types, or at-risk populations which remain underresearched. In addition, robust study designs need to be employed to help compare results between studies and provide further insights as part of the system evaluation.

In this review we used the 'Three Delays' framework to support the synthesis and classification of our research studies focusing on barriers to diagnosis and treatment. The Three delays framework has been used in other health conditions e.g. child and maternal health, emergency medicine however, to date it has not been applied to cancer care delivery.(18,19) The framework considers three contexts and three delays. The three contexts are the: Patient context (perceptions of disease, barriers to care, cost of illness); Provider context (care process quality and outcome evaluation, health care workers perceived system barriers); Community context (proximity and physical accessibility of services in the community). The three delays are: seeking care; reaching care; and receiving quality care(20) Delay 1 seeking care: This is the delay in recognizing illness and deciding to seek appropriate medical help outside the home. Delay 2 reaching care: This is the delay in reaching an appropriate health facility. Delay 3 receiving quality care: This is the delay in receiving quality care after reaching the health facility. The interconnection in the delays can be seen in Figure 1.

The aim of this investigation was to identify common factors influencing diagnostic delays of adult solid tumours and highlight areas that require further study whether that be specific countries, tumour types or settings, in order to help target resources and inform interventions that reduce cancer survivorship disparities globally.

METHODS

We undertook a systematic review following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance. The PRISMA diagram is illustrated in Figure 2

Search strategy

The literature search was conducted on 8th March 2021 in PubMed and Embase for articles published between January 1995 and March 2021. The full search strategy is in the supplementary material as Appendix 1

Eligibility criteria

The study included published articles in the English language that focused on solid cancers. The primary research was focused on SSA countries. Types of studies included quantitative (surveys, observational studies) or studies using mixed methods research methodologies. The quantitative studies had to include patients who had received a diagnosis of cancer. We excluded studies that included paediatric populations, haematologic malignancies, as well

assessments of public perceptions and awareness of cancer since the focus was on patients with a cancer diagnosis and treatment pathways. Haematological malignancies have been excluded because the pathways of referral, detection, management and prognosis are very different compared to solid organ malignancies and would require a separate evaluation.

Study selection

Two reviewers (DL and MM) screened the abstracts and full text articles with a third reviewer (AA) to resolve any conflicts. We utilized the systematic review tool Covidence to screen, extract and validate data.(21)

Data abstraction and synthesis

The two primary reviewers extracted and validated the entries together before merging the outputs. Data extracted included year of article publication; country of study; demographic characteristics (age, gender, HIV status, education, marital status, employment, income level); country level setting; disease subsite; study design; type of delay investigated, reasons for delay and primary outcomes.

Quality assessment was interrogated with ROBINS-E tool by DL and AA.(22)

Patient and public involvement

Patients and members of the public were not involved in the design, conduct or reporting of the systematic review.

RESULTS

Study characteristics

An initial search identified 6391 articles of which 193 underwent full text review (Figure 2). Fifty-seven studies were included in our final sample and data extracted.(23–78) The full data extraction output is included in the supplementary material in Appendix 2.

Country and setting profile

The majority of studies were conducted in Nigeria, 15 (26%), Ethiopia, eight (14%) and South Africa, 7 (12%). Five (9%) were undertaken in Uganda, four (7%) in Kenya, and three (5%) in Rwanda. Four (7%) studies were carried out in more than one country. Only 9% (n=5) of the studies were carried out at national level. Of the remaining studies, two thirds were conducted at the hospital level (n=38) and a quarter (n=14) being conducted at regional level.

Research design

Two thirds of included studies used a cross sectional survey design. The rest of the studies included analysis of patient-level data collected retrospectively (23%) or prospectively (11%). Case control and Delphi studies represented 4% of studies.

Tumour types

Breast cancer was the most studied tumour type for our research question (53%, n=29) followed by cervix (18%, n=10). 21% of studies (n=12) evaluated multiple tumour types whilst there were smaller studies on colorectal cancer (n=2) and Kaposi's sarcoma (n=1). There were no eligible studies on other high burden diseases in SSA such as prostate cancer and esophageal cancer identified in the literature.

Participant population

Patients identified in a hospital setting were the target population in 48 out of 56 studies. In the other studies, the target populations were: patients and clinicians (n=3), clinicians only (n=1), a combination of clinicians, public health opinion leaders and NGOs (n=1), patients in a community setting (n=2) and patients and health facility administrators (n=1)

Assessment of study quality

Fourteen cohort studies met the eligibility for a full assessment. The scores across the domains are illustrated in Figure 3. The exposure and outcome characteristics are included in the supplemental material as Appendix 3. Two cohort studies did not require full interrogation as preliminary assessment of bias by asking the following three questions placed them in the very high-risk category i) Did the authors make any attempt to control for confounding? ii) Was the method of measuring exposure inappropriate? iii) Was the method of measuring the outcome inappropriate? The remaining 40 were surveys. However, all the studies provided valuable insights that we used in the narrative synthesis. A similar finding on data quality from this region has been highlighted before in a contemporary systematic on the routes to diagnosis of symptomatic cancer in SSA.(79) Figure 3 illustrates the different domains and proportions of bias across the studies. For the studies that were assessed comprehensively all of them had an overall judgement of high or very high risk of bias. In most studies the patient related confounders (age, marital status and socioeconomic status such as income and education level were collected as variables but not controlled for appropriately. Health systems factors were poorly accounted for in statistical analysis plans.

Three delays framework

We synthesized the empirical studies into the three delay areas seeking, reaching and receiving quality cancer care. 37% (n=21) of the studies investigated all 3 delays whilst 42% (n=24) focused on 2 delays and 21% (n=12) on 1 delay. Table 1 outlines the how the various studies addressed the components of the three delays framework.

Table 1. Three delays Framework distribution of studies

First author name	Year	Cancer type	Country	N	Setting	Design	3 delays
Gebremariam(34)	2021	Breast	Ethiopia	223	Regional	Retrospec	С
Zeleke(46)	2021	Cervical	Ethiopia	410	Hospital	Retrospec	A
Mapanga(31)	2021	Lung	S. Africa	27	Regional	Delphi	A, B, C
Nakaganda(29)	2020	Multisite ¹	Uganda	359	Hospital	Survey	A, B, C
Tesfaw(63)	2020	Breast	Ethiopia	426	Regional	Retrospec	A, C
Tesfaw(65)	2020	Breast	Ethopia	371	Regional	Survey	A, C
Reibold(25)	2020	Breast	Ethiopia	51	Hospital	Survey	С
Knapp(54)	2020	Breast	Nigeria	609	Hospital	Retrospec	A, B
Leng(62)	2020	Multisite ²	Nigeria	186	Hospital	Survey	A, B, C
Togawa(55)	2020	Breast	Namibia Nigeria Uganda Zambia	1518	Hospital	Survey	A,C
Swanson(76)	2020	cervical	Uganda	268	Hospital	Survey	C

Foerster(40)	2020	Breast	Uganda, Zambia, Namibia, Nigeria	1429	Hospital	Survey	A, B, C
Dereje(45)	2020	Cervical	Ethiopia	212	Regional	Survey	A, C
Dereje(44)	2020	Cervical	Ethiopia	231	Regional	Survey	A, B
Agodirin(78)	2020	Breast	Nigeria	420	Regional	Survey	A, B, C
Martin(28)	2019	cancer type not specified	Rwanda	73	National	Survey	С
Page(66)	2019	cervical	Kenya	505	Regional	Prospect	A,B
Low(43)	2019	Multisite ³	Uganda	100	Hospital	Survey	A, B
Wambalaba(69)	2019	Multisite ⁴	Kenya	1048	National	Retrospec	A, C
Grosse Frie(57)	2019	Breast	Mali	124	Regional	Survey	A, B, C
Yang(41)	2019	Breast	Tanzania	196	Hospital	Survey	В
Schleimer(27)	2019	Breast	Rwanda	151	Regional	Retrospec	A, B, C
Foerster(61)	2019	Breast	Uganda	1335	Hospital	Prospect	A, B, C
rocister(01)	2019	Breast	Nigeria Namibia	1333	Hospital	Trospect	А, Б, С
Tapera(56)	2019	cervical	Zimbabwe	78	Regional	Survey	A, B, C
Agodirin(60)	2019	Breast	Nigeria	237	Regional	Survey	A, B, C
Rayne(33)	2019	Breast	S. Africa	252	Hospital	Survey	A, B
Subramanian(52)	2019	Breast	Kenya	800	Regional	Survey	A, B, C
Olarewaju(42)	2019	breast	Nigeria	275	Hospital	Survey	A, B, C
Ajah(30)	2019	Multisite ⁵	Nigeria	95	Hospital	Survey	A
Martei(59)	2019	Multisite ⁶	Botswana	286	Hospital	Retrospec	A
Herbst(24)	2018	Colorectal	S. Africa	162	Hospital	Retrospec	С
Anakwenze(50)	2018	Multisite ⁷	Botswana	214	Hospital	Survey	A, B
Moodley(53)	2018	Breast	S. Africa	201	Hospital	Survey	A, B
Joffe	2018	Breast	S. Africa	499	Hospital	Survey	A, B, C
Awofeso(70)	2018	Breast, Cervical	Nigeria	105	Hospital	Survey	A, B, C
Bhatia(67)	2018	Multisite ⁸	Botswana	214	Hospital	Survey	A,B
Oladeji(32)	2017	Multisite ⁹	Nigeria	218	Hospital	Survey	A, B, C
Jedy-Agba(39)	2017	Breast	Nigeria	316	National	Case- control	A, B
Alatise(58)	2017	colorectal	Nigeria	127	Hospital	Survey	A, B, C
Cacala(51)	2017	Breast	S. Africa	172	Hospital	Prospect	A, B
Brinton(48)	2016	Breast	Ghana	1184	Regional	Survey	A, B
Mlange(64)	2016	Cervical	Tanzania	202	Hospital	Survey	A, B
Mwaka(73)	2015	Cervical	Uganda	149	Hospital	Survey	A, B
Long(47)	2015	Multisite ¹⁰	Cameroon	220	Hospital	Survey	A, B, C
Pace(37)	2015	Breast	Rwanda	144	National	Survey	A, B, C

Dickens(75)	2014	Breast	S. Africa	1071	Hospital	Retrospec	В
De Boer(72)	2014	K. Sarcoma	Uganda	161	Hospital	Retrospec	A, B
Ntirenganya(71)	2014	Breast	Rwanda Sierra Leone	6820	National	Survey	A, B
Fasunla(49)	2013	Sinonasal	Nigeria	61	Hospital	Survey	A, B, C
Ibrahim(68)	2011	cervical	Sudan	197	Hospital	Retrospec	В
Anyanwu(23)	2011	breast	Nigeria	275	Hospital	Retrospec	B, C
Otieno(35)	2010	Breast	Kenya	166	Hospital	Survey	A, B, C
Ezeome(38)	2009	Breast	Nigeria	164	Hospital	Survey	A, B
Clegg-Lamptey(77)	2009	breast	Ghana	101	Hospital	Survey	A, B, C
Ukwenya(36)	2008	Breast	Nigeria	111	Hospital	Survey	A, B, C

1 – Cervix, Kaposi's sarcoma, breast, prostate, esophagus; 2 – breast, cervical, head and neck, prostate; 3 – KS, cervical cancer, breast cancer, esophageal cancer, head and neck cancer, non-Hodgkin lymphoma, vulvovaginal, prostate, conjunctival squam cell ca, penile, melanoma; 4 – Cervix, Breast, Esophagus, Prostate, Ovary, Colon, Thyroid, Pancreatic, Lung, Liver; 5 – Cervical, ovarian, endometrial, vulva, choriocarcinoma, leiomyosarcoma; 6 – cervical, breast, prostate, esophageal, lung, uterine, ovarian, colorectal, head and neck cancers, Kaposi sarcoma; 7 – Cervical, breast, head and neck, vulvar, 8aposi sarcoma, endometrial, penile, anal, esophageal, lymphoma, prostate; 8 – Cervical, Breast, Head and neck, Vulvar, Kaposi's sarcoma, Endometrial, Penile, Anal, Oesophageal, Lymphoma, Prostate; 9 – Uterine cervix, breast, head and neck, prostate, GIT; 10 – skin, breast, colorectal, gynecologic, anal; 3 delays codes A – seeking care; B – reaching care; C – receiving quality care; S. Africa – South Africa; Retrospec – Retrospective; Prospect – Prospective; K. Sarcom – Kaposi Sarcoma; N – sample size

The reasons of the delays amalgamated from the studies and identified as contributing to each type of systems delay are outlined in Table 2. The comprehensive output with outcomes of the data extraction is included as Appendix 2 in the supplementary material.

Table 2. Reasons for three delays		
Reasons for seeking care delay	Reasons for reaching care delay	Reasons for receiving quality care delay
Anticipated expense of treatment Anticipated long waiting time at clinic Belief in witchcraft Busy schedule Denial Distance Economic impact of taking time off work Embarrassment	Dependence on others for transport Difficulty making appointment or reaching doctor Distance Earlier alternative treatment Family responsibilities High cost of prediagnostic costs High cost of transport Inability to afford clinic visits Lack of knowledge of	·
 Family and friends' disapproval Fear of being asked to stop habits e.g. smoking 	estimated distance to nearest service Lack of money (for transport) Lack of navigation in	up diagnostic or treatment appointments Failure to come back for follow up diagnostic or treatment appointments Failure to find accommodation as outpatients close to treatment centre
Fear of deathFear of diagnosisFear of doctors	Lack of havigation in primary care Lack of needed caregiver to accompany to facilities Long investigation time at first contact	 Family commitments Fear of treatment (e.g. mastectomy) Fear of wasting doctor's time
 Fear of dying Fear of job loss Fear of losing part of body (e.g. breast) Fear of missing family commitments because of treatment Fear of telling people of illness Fear of treatment Fear treatment is painful Financial incapability Ignorance on available treatment Ignorance on how to seek healthcare Lack of awareness of symptoms 	 Misdiagnosis at lower levels Obligations at home Time restraints Turned away from clinics for arriving late Was told by health care worker there was no treatment for disease Work commitments 	 Few specialists Financial incapability High cost of medicines High patient volume compared to resources Lack of consent Lack of continuity of care by same healthcare workers Lack of palliative care and counselling services Lack of pathology and screening services Lack of smoking cessation clinics Lack of specific appointments with specialists Language barrier Long appointments, waiting
Lack of personal initiativeLack of trust in health system		periods • Management of pregnancy

- Low education
- No health insurance
- No one to look after children
- Obligations at home
- Preference for alternative therapies (herbal, homeopathy, Chinese, acupuncture)
- Preference for care abroad
- Preference for food supplements/organic foods
- Preference for prayers and spiritual intervention
- Pregnancy/lactation/menopa
- Prior bad experience at health centre of hospital
- Prioritising day to day survival over seeking help
- Putting others needs first
- Secrecy
- Stigma
- Transport challenges (e.g. cost)
- Travelled away from home (out of comfort zone)

- Misdiagnosis
- No bed space
- No relative to care for them during treatment
- Not healthy enough to continue treatment
- Patients changing mobile numbers so cannot be contacted for further management
- Paying out of pocket expenses
- Poor collaboration amongst health care workers
- Poor nutrition
- Poorly trained staff
- Power outages
- Pre-referral diagnosis not communicated
- Preference for alternative therapies (herbal, Chinese, acupuncture, food supplements)
- Preference to observe
- Surgeon/operating room unavailability
- Unavailability of treatment modality
- Unwelcoming, demotivated and uncommitted staff turn patients away

Seeking delay

Reasons for delays in seeking care included a lack of awareness about cancer and low health literacy which manifested itself as fears, false perceptions and beliefs and embarrassment cancer.(26,28,31,32,35,37,38,40,42,42,44,51,55,58,60,64,65,67,70,71,73,77,78) There was also a preference traditional faith-based seeking treatment from or healers.(27,30,32,35-38,42,44,46,48,49,51,55,57,58,65,70,71,77,78) Participants in the various studies recounted the belief they had not been sick enough or didn't have adequate money to justify abandoning their obligations (both financial and social)(26,27,29,31,37,38,42,45,51,52,55,56,58,72,77,78); they rather reassured themselves about the seriousness of symptoms (for example lumps) as the symptoms did not cause disability or pain in the early stages of disease and that it was self-limiting. (26,31,36–38,42,44,47,51,53,67,73,78) Additionally, not knowing where or how to enter the health system for symptoms before they cause life threatening conditions contributed to delays in seeking treatment. (31,37,44,46) The unknown costs of managing cancer was also noted to intimidate patients and delay presentation as a result.(26,44)

Reaching care

The physical distance to appropriate care was cited as a major barrier for patients who have to take into consideration transport costs to specialist facilities, accommodation and subsistence costs.(23,27–29,32,33,37,40–42,47,50–52,55,56,60,62,71–73,77,78) Even when transport is made available, they carry the cost of being away from their jobs and families. Other than geographical distance, low levels of cancer care knowledge amongst primary level healthcare staff was also a barrier for referral of patients.(31,37,45,70,74,78) This was identified as a source of misdiagnosis and underlay the lack of

recognition for the urgency of transferring care to tertiary institutions. In one study, participants had reported that they had been misinformed at the primary level that their condition was incurable.(38)

Receiving quality care

The paucity of infrastructure, equipment, medication and human resources needed for cancer care underpinned the barriers to receiving quality cancer care.(28,62,69) We noted a lack of availability or poor quality diagnostic equipment and treatment facilities were also challenges identified.(58,62,70) Other factors included demotivated and burnt-out staff and the lack of specialist training of staff in cancer.(25,28,31,32,38,56,62) Tensions and mistrust of the system as a whole between the patients and healthcare providers operating in constrained environments were reported as contributing to factors that drove patients to alternate medicine or even simply abandon treatment.(31,47,52) In addition, the lack of availability of essential resources lead to high prices and catastrophic out of pocket expenses for the patients.(23,29,31,32,36,42,47,49,52,55,56,61,62,76,77)

Discussion

The impact of delays in the cancer care pathway on persistent high mortality rates are well recognized. Sub Saharan African countries are called upon to accelerate the establishment and implementation of their cancer control plans and it is pertinent to recognize that whilst respecting the unique aspects of each nation, utilization of a common knowledge base avoids duplication and allows for prudent efficient use of scarce resources.(2,16) In this regard, results from research using a robust methodological approach provides a foundation for common knowledge that is applicable broadly.(17)

However, our systematic review of studies in Sub-Saharan Africa investigating the barriers to access to cancer care demonstrates a very limited number of studies despite the importance of this subject area, with heterogeneity in study design which limits their translational impact. The publications we found were clustered to the Northern and West African regions and given the heterogenous factors influencing the SSA region data cannot reliably be extrapolated across the continent. In addition, 70% of the studies focused on breast and cervical cancer with major causes of cancer related mortality and morbidity such as prostate and esophageal cancer not addressed which is of major concern. The results highlight the need for a coordinated approach to manage these evidence gaps with no studies addressing the barriers to diagnosis and treatment of cancer identified in 35 of 48 countries in SSA.

The capacity to conduct robust research is increasingly possible across countries in SSA but it requires considerable efforts to coordinate these resources to support a common agenda based on country and regional level priorities.(80,81) Presently, a discordance between research needs and research funding priorities across the continent has been accelerated by the synthetic external agendas in individual countries rather than supporting endogenous solutions driven by those experiencing the problems.(82,83) This is exemplified by our findings which show research is concentrated on a pool of 4 or 5 better resourced countries and two main tumour types likely related to the availability of external funding.

Most published data have been obtained through cross sectional surveys, which detail the prevalence of reasons for delays but fail to account for important cofounding factors and system level processes to enable the effective problem solving. None the less they still provide a valuable baseline insights that we integrated into a "Three delays" model.

The common roots of the reasons for delays at each level of seeking, reaching, and receiving quality care as listed in Table 2. are firstly fear (apprehension or mistrust) and secondly, a lack of resources (financial, human or infrastructure). Across all delays cost is a major factor that influences the interval between the stages in the cancer pathway. Out of pocket expenses are high with patients requiring cover for transport,

accommodation, diagnostic tests and medicines. A significant number of patients live under the poverty line and it may seem unrealistic for the families to spend on what is perceived to be an incurable disease in the first instance.(84) A recent study demonstrated the threat of catastrophic health expenditure that accompanies a cancer diagnosis even with the basic drugs in Low and Middle Income Countries (LMICs).(85)

In seeking care, fear is compounded by the lack of awareness (knowledge) on the disease, availability of services or how to navigate the pathways to quality healthcare. It can drive patients to rely on familiar systems of alternative medicines (traditional healers, 'Chinese' medicine, Faith based healers). In addition to these challenges taking time off from work or domestic obligations to attend healthcare appointments is often relegated in terms of priorities due to financial and social implications. Societal expectations also create fear of stigmatism and promote secrecy that hinder free information flow between those seeking it and its custodians.

For reaching care the lack of adequate coordination of services was the dominant theme. Poorly trained staff or lack of support for primary health care practitioners delayed referrals to more specialized services and the health system in such a scenario could possibly discourage patients on the curability of the condition. Links and relationships are essential between primary and secondary/tertiary healthcare as most patients will present first to local clinics or health posts. This is particularly important where systems are not electronically linked for results to be easily attainable between practitioners.

To receive quality care, patients need access to a health care the system with appropriate human resource and infrastructure (diagnostic and treatment). A lack of human resource encompasses both the competence of the workforce for tertiary services as well as the actual low numerical value of specialized knowledgeable staff leading to burnout. Equally a skilled and competent workforce without appropriate infrastructure or sufficient medication and surgical supplies cannot be expected to deliver quality care. Another aspect to consider for receiving quality care includes patient factors like good nutritional status, financial capacity, and social capital to undergo treatment. Acceptance and adherence to treatment are also integral to a successful intervention as investigated by Anyanwu et al.(23)

The findings from our study suggests that reasons for delays are interlinked both at an individual level and population level (Figure 1). An individual with vulnerabilities at the seeking level phase would most likely experience repetitive barriers in reaching care as well as receiving quality care. An underdeveloped health system with poor linkages between primary health care and tertiary level care will inevitably have a large proportion of patients falling through the cracks between phases of care. This could be due to untimely referrals and inability to support diagnostic costs thereby relying on the patient to raise funds.

Limitations of the study

A major limitation in the interpretation and application of the findings of this research output is the quality of the included study. Recognition of this limitation and application of additional triangulation has assisted us to utilise what is available in this space.

Future directions based on our findings would be to conduct more research studies that will provide quality data for policy formation and effective implementation

Conclusion

 To see a reduction in cancer mortality in Sub Saharan Africa health systems need to address delays within the cancer pathway from initial presentation and appraisal to completion of treatment and the survivorship pathway. Holistic support for the patient as well as the workforce across the continuum and longitudinally in each phase is important to achieve good outcomes. Cognizance of the multiple barriers present for individual patients from developing a cancer to its treatment is important for policy makers and experts to build resilient and effective cancer control programs. With an individual in mind an effective population

approach can be achieved. Due to the paucity of organized data in SSA, the starting point of research is often extrapolated from other regions who have different realities. In carrying out this systematic review we intend to provide an organized pool of information that will provide a robust resource for other researchers seeking to conduct studies in SSA.

Figure 1. Three Delays Framework

Figure 2. Flowchart of study selection as per Preferred Reporting

Figure 3. Quality assessment of studies , n= 14. McGuinness, LA, Higgins, JPT. Risk-of-bias VISualization (robvis): An R package and Shiny web app for visualizing risk-of-bias assessments. Res Syn Meth. 2020; 1-7. https://doi.org/10.1002/jrsm.1411

Contributorship DCL, MM and AA were involved in all aspects. SM, VB, MS, ASS, RM, JS and ADM participated in study design, data interpretation, preparation and revision of manuscript

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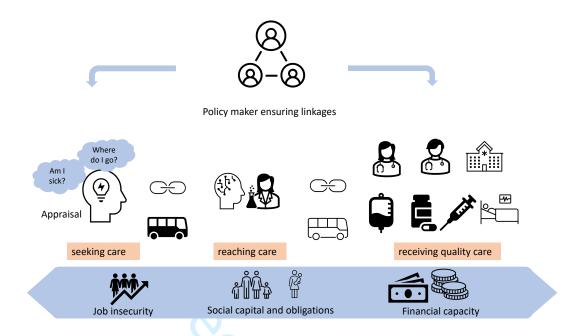


Figure 1: Three Delays Framework

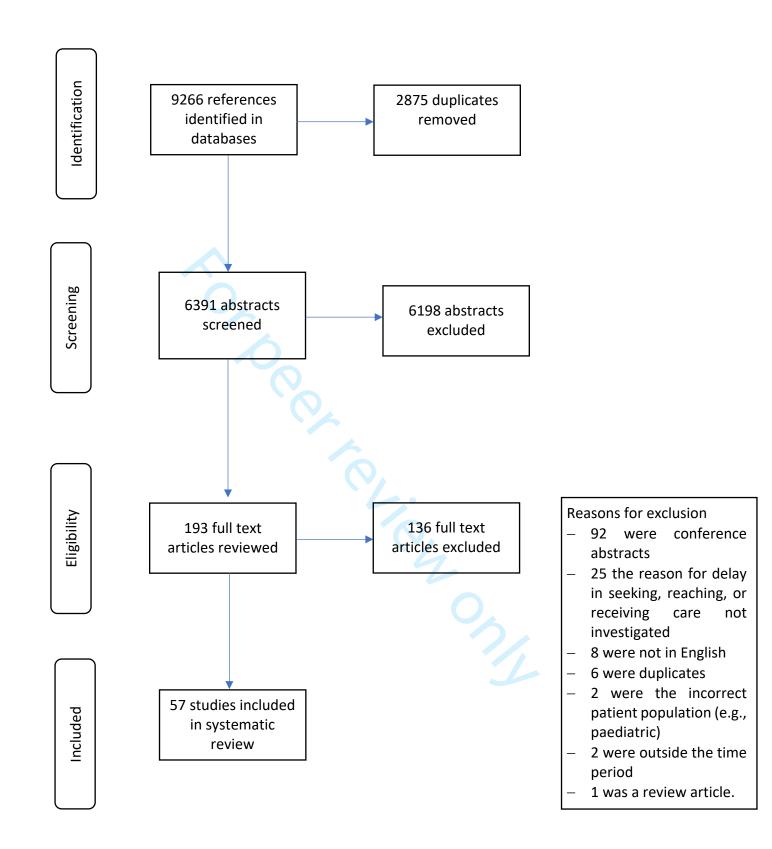
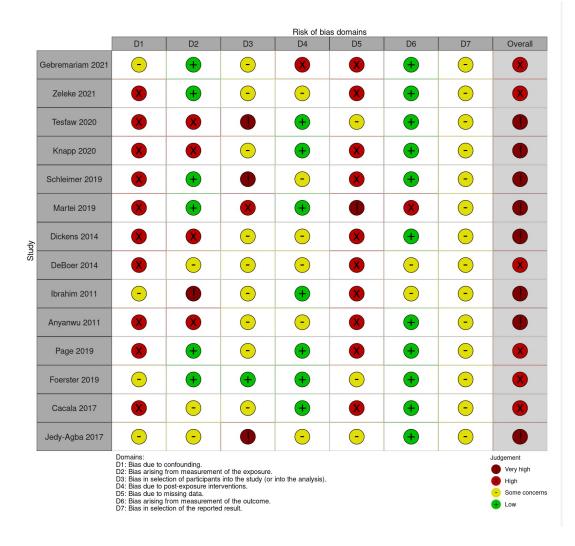


Figure 2. Flowchart of study selection as per Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance



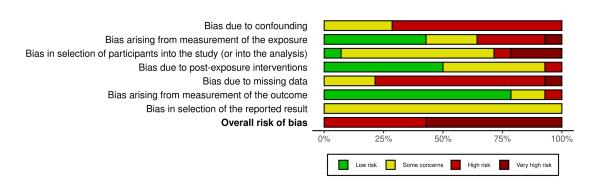


Figure 3. Quality assessment of studies , n=14.

McGuinness, LA, Higgins, JPT. Risk-of-bias VISualization (robvis): An R package and Shiny web app for visualizing risk-of-bias assessments. Res Syn Meth. 2020; 1-7. https://doi.org/10.1002/jrsm.1411

Appendix 1. Search Strategy

Systematic review	
Databases	PubMed
Search terms	Synonyms
1. Cancer	cancer OR tumour OR tumor OR neopla* OR malignan* OR
ti,ab	carcinoma
2. Delay	barrier* OR delay* OR access OR late OR interval
ti, ab	
3. Diagnosis and	diagnos* OR presentation OR intervention OR referral OR
treatment	consult* OR treatment OR therap*
ti, ab	
4. countries	angola OR benin OR botswana OR burkina faso OR burundi
ti,ab	OR cameroon OR cameron OR cape verde OR cabo verde OR
	central african republic OR ubangi shari OR chad OR
	comoros OR comoro islands OR iles comores OR congo
	brazzaville OR congo democratic republic OR democratic
	republic of congo OR congo OR zaire OR cote d ivoire OR
	cote divoire OR ivory coast OR djibouti OR french
	somaliland OR equatorial guinea OR eritrea OR ethiopia OR gabon OR Gabonese republic OR gambia OR ghana OR gold
	coast OR guinea OR guinea bissau OR kenya OR lesotho OR
	basutoland OR liberia OR madagascar OR malagasy OR
	malawi OR nyasaland OR mali OR mauritania OR mauritius
	OR mozambique OR namibia OR niger OR nigeria OR
	réunion OR rwanda OR Ruanda OR sao tome OR principe OR
	senegal OR seychelles OR sierra leone OR somalia OR south
	africa OR south sudan OR sudan OR swaziland OR tanzania
	OR tanganyika OR togo OR togolese republic OR uganda OR
	zambia OR zimbabwe OR africa OR african
5. Qualitative search	qualitative* OR narrative* OR interview* OR focus group*
terms	OR grounded theory*

Systematic review	
Databases	EMBASE
Search terms	Synonyms
1. Cancer	cancer:ti,ab OR tumour:ti,ab OR tumor:ti,ab OR neopla*:ti,ab
ti,ab	OR malignan*:ti,ab OR carcinoma:ti,ab
2. Delay	barrier*:ti,ab OR delay*:ti,ab OR access:ti,ab OR late:ti,ab OR
	interval:ti,ab
3. Diagnosis and	diagnos*:ti,ab OR presentation:ti,ab OR intervention:ti,ab
treatment	OR referral:ti,ab OR consult*:ti,ab OR treatment:ti,ab OR
ti, ab	therap*:ti,ab
4. Sub-Saharan Africa	angola:ti,ab OR benin:ti,ab OR botswana:ti,ab OR 'burkina
ti, ab	faso':ti,ab OR burundi:ti,ab OR cameroon:ti,ab OR
	cameron:ti,ab OR 'cape verde':ti,ab OR 'cabo verde':ti,ab OR
	'central african republic':ti,ab OR 'ubangi shari':ti,ab OR
	chad:ti,ab OR comoros:ti,ab OR 'comoro islands':ti,ab OR
	'iles comores':ti,ab OR 'congo brazzaville':ti,ab OR 'congo
	democratic republic':ti,ab OR 'democratic republic
	congo':ti,ab OR congo:ti,ab OR zaire:ti,ab OR 'cote
	divoire':ti,ab OR 'cote d ivoire':ti,ab OR 'ivory coast':ti,ab OR
	djibouti:ti,ab OR 'french somaliland':ti,ab OR 'equatorial
	guinea':ti,ab OR eritrea:ti,ab OR ethiopia:ti,ab OR gabon:ti,ab
	OR 'gabonese republic':ti,ab OR gambia:ti,ab OR ghana:ti,ab
	OR 'gold coast':ti,ab OR guinea:ti,ab OR 'guinea bissau':ti,ab
	OR kenya:ti,ab OR lesotho:ti,ab OR basutoland:ti,ab OR
	liberia:ti,ab OR madagascar:ti,ab OR malagasy:ti,ab OR
	malawi:ti,ab OR nyasaland:ti,ab OR mali:ti,ab OR
	mauritania:ti,ab OR mauritius:ti,ab OR mozambique:ti,ab OR
	namibia:ti,ab OR niger:ti,ab OR nigeria:ti,ab OR réunion:ti,ab
	OR rwanda:ti,ab OR ruanda:ti,ab OR 'sao tome':ti,ab OR
	'principe':ti,ab OR senegal:ti,ab OR seychelles:ti,ab OR
	'sierra leone':ti,ab OR somalia:ti,ab OR 'south africa':ti,ab OR
	'south sudan':ti,ab OR sudan:ti,ab OR swaziland:ti,ab OR
	tanzania:ti,ab OR tanganyika:ti,ab OR togo:ti,ab OR 'togolese
	republic':ti,ab OR uganda:ti,ab OR zambia:ti,ab OR
	zimbabwe:ti,ab OR africa:ti,ab OR african:ti,ab
5. Qualitative search	qualitative*:ti,ab OR narrative*:ti,ab OR interview*:ti,ab OR
terms	focus group*:ti,ab OR grounded theory*:ti,ab

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Appendix 2. Data extraction sheet

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100	First auth	har Year of	Cancer Inge	Country	De Letting side	ata nition Participants	Design	Sample Size	1	I	C	Palleri factors	. Emple	ingeneral/			Mass of modernia C	talance from beoptic!	Total of a	ting marking	Abound	Reasons for type of delay seeking care	Secure for last of drive madest con-	Research for typer of differy remaining equality case:	-	Columns modifies com	T		
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Appendix 3. Exposures and Outcome for cohort studies

Table 1. Exposure-Outcor	me relationship for cohort s	tudies
Author	Exposure	Outcome
Cacala 2017	Breast Cancer pathway to diagnosis (symptom appraisal to presentation to clinic)	Late presentation of Breast Cancer (T-stage)
De Boer 2014	Kaposi's Sarcoma pathway to diagnosis	Delay in diagnosis of Kaposi's Sarcoma (Poor outcomes)
Dickens 2014	Distance from diagnostic hospital to treatment center	Stage of breast cancer at diagnosis
Foerster 2019	Breast Cancer Pathway to treatment	Receipt of treatment
Gebremariam 2021	Breast Cancer Care pathway to chemotherapy	Time to initiation of chemotherapy
Ibrahim 2011	Cervical cancer pathway to diagnosis (symptom appraisal to presentation to clinic)	Advanced stage disease
Jedy-Agba 2017	Breats Cancer Pathway to diagnosis	Stage at diagnosis
Knapp 2020	Geospatial access	Cancer stage at diagnosis
Martei 2019	Chemotherapy stock out	Suboptimal therapy delivery
Page 2019	Positive HPV test	Acceptance and adherence to diagnostic procedure and treatment
Schleimer 2019	Pathway from diagnosis to surgery	Delay to appropriate operative treatment
Tesfaw 2020	Breast Cancer diagnostic pathway; patient delay>3 months	Advanced stage of cancer at diagnosis
Zeleke 2021	Cervical Cancer Diagnostic pathway	Stage IIIA-IVB presentation



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
TITLE			
Title	1	Identify the report as a systematic review.	1
ABSTRACT			
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	2
INTRODUCTION	-		
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	5,6
METHODS			
5 Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	6
f Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	6
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix 1
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	6
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Appendix 2
27 28	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Appendix 2
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	6,7,8 Figure 3
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Appendix 2
2 Synthesis 3 methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	n/a
4 5	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	n/a
6	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	n/a
7 8 0	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	n/a
.0	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	n/a
1	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	n/a
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	6,7,8 Figure 3
Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome in peer review only interior peer review on the peer review on the peer review on the peer review of the peer review on the peer review of the	n/a

Page 33 of 32 BMJ Open



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	7
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Figure 2
Study characteristics	17	Cite each included study and present its characteristics.	7, Appendix 2
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Figure 3
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Appendix 2
Results of	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	n/a
syntheses	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	n/a
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	n/a
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	n/a
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Figure 3
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	n/a
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	16,17,18
	23b	Discuss any limitations of the evidence included in the review.	18
	23c	Discuss any limitations of the review processes used.	n/a
	23d	Discuss implications of the results for practice, policy, and future research.	18
OTHER INFORMA	TION		
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	n/a
protocoi	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Notprepared
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	n/a
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	19
Competing interests	26	Declare any competing interests of review authors.	19
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	19

44 From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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Delays in seeking, reaching and access to quality cancer care in sub-Saharan Africa: a systematic review

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Complete List of Authors:	Lombe, Dorothy; Te Whatu Ora Health NZ MidCentral, Radiation Oncology Mwamba, Monde; ZAMBART Msadabwe, Susan; Cancer Diseases Hospital Bond, Virginia; London School of Hygiene & Tropical Medicine and ZAMBART, Social Science Simwinga, Musonda; Zambart Ssemata, Andrew Sentoogo; The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit Muhumuza, Richard; The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit Seeley, Janet; London School of Hygiene and Tropical Medicine, Department of Global Health &Development Mwaka, Amos; Makerere University CHS, Department of Medicine Aggarwal, Ajay; King's College London
Primary Subject Heading :	Health policy
Secondary Subject Heading:	Global health
Keywords:	Adult oncology < ONCOLOGY, Urological tumours < ONCOLOGY, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

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Delays in seeking, reaching and access to quality cancer care in sub-Saharan Africa: a systematic review

Dorothy Chilambe Lombe¹
Monde Mwamba²
Susan Msadabwe³
Virginia Bond²,⁴
Musonda Simwinga²
Andrew Sentoogo Ssemata⁵
Richard Muhumuza⁵
Janet Seeley⁴,⁵
Amos Deogratius Mwaka⁶
Ajay Aggarwal⁴,₹

¹Cancer Screening, Treatment and Support MidCentral, New Zealand

²Zambart, School of Public Health, Ridgeway Campus, University of Zambia, Lusaka, Zambia

³Cancer Diseases Hospital, Lusaka, Zambia

⁴London School of Hygiene & Tropical Medicine (LSHTM), Keppel Street, London, UK ⁵The Medical Research Council/ Uganda Virus Research Institute and London School of Hygiene & Tropical Medicine (MRC/UVRI & LSHTM) Uganda Research Unit, P.O. Box 49, Entebbe, Uganda

⁶Department of Medicine, Faculty of Medicine, Gulu University, Gulu, Uganda ⁷Institute of Cancer Policy, King's College London, London, UK

Correspondence to:

Dr Dorothy Chilambe Lombe

Postal address: Gate 2, Heretaunga Street, Private Bag 11036, Palmerston North 4442, New

Zealand

Email: dorothylombe@yahoo.com

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Abstract

Objectives: Late presentation and delays in diagnosis and treatment consistently translate into poor outcomes in sub-Saharan Africa (SSA). The aim of this study was to collate and appraise the factors influencing diagnostic and treatment delays of adult solid tumours in SSA.

Design: Systematic review with assessment of bias using Risk of Bias in Non- randomized Studies of Exposures (ROBINS-E) tool.

Data sources: PubMed and Embase, for publications from January 1995 to March 2021.

Eligibility criteria: Inclusion criteria: quantitative or mixed method research, publications in English, on solid cancers in SSA countries. Exclusion criteria: paediatric populations, haematologic malignancies, and assessments of public perceptions and awareness of cancer (since the focus was on patients with a cancer diagnosis and treatment pathways).

Data extraction and synthesis: Two reviewers extracted and validated the studies. Data included year of publication; country; demographic characteristics; country level setting; disease subsite; study design; type of delay, reasons for delay and primary outcomes.

Results: 57 out of 193 full text review were included. 40% were from Nigeria or Ethiopia. 70% focused on breast or cervical cancer. 43 studies had a high risk of bias at preliminary stages of quality assessment. 14 studies met the criteria for full assessment and all totaled to either high or very high risk of bias across 7 domains. Reasons for delays included high costs of diagnostic and treatment services; lack of coordination between primary, secondary and tertiary health care sectors; inadequate staffing; and continued reliance on traditional healers and complimentary medicines.

Conclusions: Robust research to inform policy on the barriers to quality cancer care in SSA is absent. The focus of most research is on breast and cervical cancers. Research outputs are from few countries. It is imperative that we investigate the complex interaction of these factors to build resilient and effective cancer control programs.

Strengths and limitations of this study

- The study interrogated two layers of factors (context and delays) by considering the 'Three Delays' framework.
- We used the Risk of Bias in non- randomized Studies of Exposures (ROBINS-E) tool to evaluate the quality of studies.
- We reduced heterogeneity by focusing on solid tumours, excluding awareness studies and restricting the timeframe to allow for applicability of findings to the evolving health care systems with time.
- The quality of the studies included was largely poor; however, rigorous assessment of risk of bias across seven domains allowed deduction of key study findings that are a useful steppingstone for further investigation.

INTRODUCTION

The cancer control agenda has globally received a high level of political recognition.(1,2) In sub-Saharan Africa (SSA), with an age standardized incidence and mortality rate of 128.2 and 87.2 per 100 000 people respectively, cancer is becoming a leading public health problem.(3) There is growing emphasis that the successful translation of commitments to support cancer control policy into substantial reductions in cancer morbidity and mortality must occur on a locally adapted evidence-based platform but robust local research is lacking in contrast with developed nations.

Countries in SSA operate in an environment of low resources, which has resulted in cancer management largely focusing on those presenting with overt symptomatic disease.(4,5) The system level challenges are heterogenous across SSA but factors germane to all countries includes limited health care financing, inadequate financial protection (universal health coverage), inadequate infrastructure development as well as the need for health systems to manage a dual burden of infectious disease and growing non-communicable diseases.(5–8)

The lack of coordination and fragmented pathways in cancer care at all stages including prevention, symptom awareness, diagnosis, treatment and post treatment care makes cancer hard to manage in developing nations and ultimately result in high levels of premature mortality.(9) Interventions occur in silos within three distinct groups 1) across specific cancer types which are prioritized(10); 2) across prevention, treatment, palliation(11); 3) across primary, secondary and tertiary health care sectors(12). Additionally, building strong system linkages to coordinate cancer care across primary, secondary and tertiary sectors within country are generally overlooked and this results in critical delays.(9)

Fragmented pathways of care and research priorities are also reflective of the dependence on external international financial donors which tend to support their own specific agendas perpetuating silos of development.(13,14) This approach can be considered reductionist as it fails to consider the system and structural drivers of inequalities in access to diagnosis and treatment.

Evaluation of the unique social, economic, geographic and cultural determinants for late diagnosis and poor treatment outcomes are imperative to provide locally generated evidence. This will ensure the effective implementation of national cancer control programs.(15,16) These factors are not just context specific (e.g., country, region) but also tumour specific. An array of factors including accessibility to care (distance and cost), quality of care, coordination of care across health care sectors, education and training, as well as intricate personal and community relationships (values, beliefs, socioeconomic parameters, gender) need to be interpreted in each situation and considered explicitly.

Empirical work has sought to identify the factors influencing cancer diagnosis and treatment delay.(17) However, to our knowledge there have been no attempts to synthesize the available evidence from primary quantitative research undertaken in the SSA context to inform cancer control policies and identify gaps in the current research literature. Gaps would include country settings, tumour types, or at-risk populations which remain underresearched. In addition, robust study designs need to be employed to help compare results between studies and provide further insights as part of the system evaluation.

In this review we used the 'Three Delays' framework to support the synthesis and classification of research studies focusing on barriers to diagnosis and treatment. The three delays framework has been used in other health conditions e.g. child and maternal health, emergency medicine however, to date it has not been applied to cancer care delivery. (18,19) The framework considers three contexts and three delays. The three contexts are the: Patient context (perceptions of disease, barriers to care, cost of illness); Provider context (care process quality and outcome evaluation, health care workers perceived system barriers); Community context (proximity and physical accessibility of services in the community). The three delays are: seeking care; reaching care; and receiving quality care(20) Delay 1 seeking care: This is the delay in recognizing illness and deciding to seek appropriate medical help outside the home. Delay 2 reaching care: This is the delay in reaching an appropriate health facility. Delay 3 receiving quality care: This is the delay in receiving quality care after reaching the health facility. The interconnection in the delays can be seen in Figure 1.

The aim of this investigation was to identify common factors influencing diagnostic delays of adult solid tumours and highlight areas that require further study whether that be specific countries, tumour types or settings, in order to help target resources and inform interventions that reduce cancer survivorship disparities globally.

METHODS

Study design

We undertook a systematic review and the findings are reported according to the guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). The study selection flowchart diagram is presented in Figure 2

Search strategy

The literature search was conducted on 8th March 2021 in PubMed and Embase for articles published between January 1995 and March 2021. We restricted the timeframe to allow for relevance and applicability of findings to the evolving health care systems with time. The full search strategy is in the supplementary material as Appendix 1

Eligibility criteria

The study included published articles in the English language that focused on solid cancers. The primary research was focused on SSA countries. Types of studies included quantitative (surveys, observational studies) or studies using mixed methods research methodologies. The quantitative studies had to include patients who had received a diagnosis of cancer. We excluded studies that included paediatric populations, haematologic malignancies, as well assessments of public perceptions and awareness of cancer since the focus was on patients with a cancer diagnosis and treatment pathways. Haematological malignancies have been excluded because the pathways of referral, detection, management and prognosis are very different compared to solid organ malignancies and would require a separate evaluation.

Study selection

Two reviewers (DL and MM) screened the abstracts and full text articles with a third reviewer (AA) to resolve any conflicts. We utilized the systematic review tool Covidence to screen, extract and validate data.(21)

Data abstraction and synthesis

The two primary reviewers extracted and validated the entries together before merging the outputs. Data extracted included year of article publication; country of study; demographic characteristics (age, gender, HIV status, education, marital status, employment, income level); country level setting; disease subsite; study design; type of delay investigated, reasons for delay and primary outcomes.

Quality assessment was interrogated with ROBINS-E tool by DL and AA.(22)

Patient and public involvement

None.

RESULTS

Study characteristics

An initial search identified 6391 articles of which 193 underwent full text review (Figure 2). Fifty-seven studies were included in our final sample and data extracted.(23–78) The full data extraction output is included in the supplementary material in Appendix 2.

Country and setting profile

The majority of studies were conducted in Nigeria, 15 (26%), Ethiopia, eight (14%) and South Africa, 7 (12%). Five (9%) were undertaken in Uganda, four (7%) in Kenya, and three (5%) in Rwanda. Four (7%) studies were carried out in more than one country. Only 9% (n=5) of the studies were carried out at national level. Of the remaining studies, two thirds were conducted at the hospital level (n=38) and a quarter (n=14) being conducted at regional level.

Research design

Two thirds of included studies used a cross sectional survey design. The rest of the studies included analysis of patient-level data collected retrospectively (23%) or prospectively (11%). Case control and Delphi studies represented 4% of studies.

Tumour types

Breast cancer was the most studied tumour type for our research question (53%, n=29) followed by cervix (18%, n=10). 21% of studies (n=12) evaluated multiple tumour types whilst there were smaller studies on colorectal cancer (n=2) and Kaposi's sarcoma (n=1). There were no eligible studies on other high burden diseases in SSA such as prostate cancer and esophageal cancer identified in the literature.

Participant population

Patients identified in a hospital setting were the target population in 48 out of 56 studies. In the other studies, the target populations were patients and clinicians (n=3), clinicians only (n=1), a combination of clinicians, public health opinion leaders and NGOs (n=1), patients in a community setting (n=2) and patients and health facility administrators (n=1)

Assessment of study quality

Fourteen cohort studies met the eligibility for a full assessment. The scores across the domains are illustrated in Figure 3. The exposure and outcome characteristics are included in the supplemental material as Appendix 3. Two cohort studies did not require full interrogation as preliminary assessment of bias by asking the following three questions placed them in the very high-risk category i) Did the authors make any attempt to control for confounding? ii) Was the method of measuring exposure inappropriate? iii) Was the method of measuring the outcome inappropriate? The remaining 40 were surveys. However, all the studies provided valuable insights that we used in the narrative synthesis. A similar finding on data quality from this region has been highlighted before in a contemporary systematic on the routes to diagnosis of symptomatic cancer in SSA.(79) Figure 3 illustrates the different domains and proportions of bias across the studies. For the studies that were assessed comprehensively all of them had an overall judgement of high or very high risk of bias. In most studies the patient related confounders (age, marital status and socioeconomic status such as income and education level were collected as variables but not controlled for appropriately. Health systems factors were poorly accounted for in statistical analysis plans.

Three delays framework

We synthesized the empirical studies into the three delay areas: seeking, reaching and receiving quality cancer care. 37% (n=21) of the studies investigated all 3 delays whilst 42% (n=24) focused on 2 delays and 21% (n=12) on 1 delay. Table 1 outlines the how the various studies addressed the components of the three delays framework.

Table 1. Three delays framework distribution of studies

First author name	Year	Cancer type	Country	N	Setting	Design	3 delays
Gebremariam(34)	2021	Breast	Ethiopia	223	Regional	Retrospec	С
Zeleke(46)	2021	Cervical	Ethiopia	410	Hospital	Retrospec	A
Mapanga(31)	2021	Lung	S. Africa	27	Regional	Delphi	A, B, C
Nakaganda(29)	2020	Multisite ¹	Uganda	359	Hospital	Survey	A, B, C
Tesfaw(63)	2020	Breast	Ethiopia	426	Regional	Retrospec	A, C
Tesfaw(65)	2020	Breast	Ethiopia	371	Regional	Survey	A, C
Reibold(25)	2020	Breast	Ethiopia	51	Hospital	Survey	С
Knapp(54)	2020	Breast	Nigeria	609	Hospital	Retrospec	A, B
Leng(62)	2020	Multisite ²	Nigeria	186	Hospital	Survey	A, B, C

Togawa(55) 2020 Breast		Breast	Namibia Nigeria Uganda Zambia	1518	Hospital	Survey	A,C
Swanson(76)	2020	cervical	Uganda	268	Hospital	Survey	С
Foerster(40)	2020	Breast	Uganda, Zambia, Namibia, Nigeria	1429	Hospital	Survey	A, B, C
Dereje(45)	2020	Cervical	Ethiopia	212	Regional	Survey	A, C
Dereje(44)	2020	Cervical	Ethiopia	231	Regional	Survey	A, B
Agodirin(78)	2020	Breast	Nigeria	420	Regional	Survey	A, B, C
Martin(28)	2019	cancer type not specified	Rwanda	73	National	Survey	С
Page(66)	2019	cervical	Kenya	505	Regional	Prospect	A,B
Low(43)	2019	Multisite ³	Uganda	100	Hospital	Survey	A, B
Wambalaba(69)	2019	Multisite ⁴	Kenya	1048	National	Retrospec	A, C
Grosse Frie(57)	2019	Breast	Mali	124	Regional	Survey	A, B, C
Yang(41)	2019	Breast	Tanzania	196	Hospital	Survey	В
Schleimer(27)	2019	Breast	Rwanda	151	Regional	Retrospec	A, B, C
Foerster(61)	2019	Breast	Uganda Nigeria Namibia	1335	Hospital	Prospect	A, B, C
Tapera(56)	2019	cervical	Zimbabwe	78	Regional	Survey	A, B, C
Agodirin(60)	2019	Breast	Nigeria	237	Regional	Survey	A, B, C
Rayne(33)	2019	Breast	S. Africa	252	Hospital	Survey	A, B
Subramanian(52)	2019	Breast	Kenya	800	Regional	Survey	A, B, C
Olarewaju(42)	2019	breast	Nigeria	275	Hospital	Survey	A, B, C
Ajah(30)	2019	Multisite ⁵	Nigeria	95	Hospital	Survey	A
Martei(59)	2019	Multisite ⁶	Botswana	286	Hospital	Retrospec	A
Herbst(24)	2018	Colorectal	S. Africa	162	Hospital	Retrospec	С
Anakwenze(50)	2018	Multisite ⁷	Botswana	214	Hospital	Survey	A, B
Moodley(53)	2018	Breast	S. Africa	201	Hospital	Survey	A, B
Joffe (26)	2018	Breast	S. Africa	499	Hospital	Survey	A, B, C
Awofeso(70)	2018	Breast, Cervical	Nigeria	105	Hospital	Survey	A, B, C
Bhatia(67)	2018	Multisite ⁸	Botswana	214	Hospital	Survey	A,B
Oladeji(32)	2017	Multisite ⁹	Nigeria	218	Hospital	Survey	A, B, C
Jedy-Agba(39)	2017	Breast	Nigeria	316	National	Case- control	A, B
Alatise(58)	2017	colorectal	Nigeria	127	Hospital	Survey	A, B, C
			-		Hospital	-	A, B
Cacala(51)	2017	Breast	S. Africa	172	поѕрцаі	Prospect	A, D

Mlange(64)	2016	Cervical	Tanzania	202	Hospital	Survey	A, B
Mwaka(73)	2015	Cervical	Uganda	149	Hospital	Survey	A, B
Long(47)	2015	Multisite ¹⁰	Cameroon	220	Hospital	Survey	A, B, C
Pace(37)	2015	Breast	Rwanda	144	National	Survey	A, B, C
Tadesse(74)	2015	cervical	Ethiopia	198	Hospital	Survey	B, C
Dickens(75)	2014	Breast	S. Africa	1071	Hospital	Retrospec	В
De Boer(72)	2014	K. Sarcoma	Uganda	161	Hospital	Retrospec	A, B
Ntirenganya(71)	2014	Breast	Rwanda Sierra Leone	6820	National	Survey	A, B
Fasunla(49)	2013	Sinonasal	Nigeria	61	Hospital	Survey	A, B, C
Ibrahim(68)	2011	cervical	Sudan	197	Hospital	Retrospec	В
Anyanwu(23)	2011	breast	Nigeria	275	Hospital	Retrospec	B, C
Otieno(35)	2010	Breast	Kenya	166	Hospital	Survey	A, B, C
Ezeome(38)	2009	Breast	Nigeria	164	Hospital	Survey	A, B
Clegg-Lamptey(77)	2009	breast	Ghana	101	Hospital	Survey	A, B, C
Ukwenya(36)	2008	Breast	Nigeria	111	Hospital	Survey	A, B, C

1 – Cervix, Kaposi's sarcoma, breast, prostate, esophagus; 2 – breast, cervical, head and neck, prostate; 3 – KS, cervical cancer, breast cancer, esophageal cancer, head and neck cancer, non-Hodgkin lymphoma, vulvovaginal, prostate, conjunctival squam cell ca, penile, melanoma; 4 – Cervix, Breast, Esophagus, Prostate, Ovary, Colon, Thyroid, Pancreatic, Lung, Liver; 5 – Cervical, ovarian, endometrial, vulva, choriocarcinoma, leiomyosarcoma; 6 – cervical, breast, prostate, esophageal, lung, uterine, ovarian, colorectal, head and neck cancers, Kaposi sarcoma; 7 – Cervical, breast, head and neck, vulvar, 8aposi sarcoma, endometrial, penile, anal, esophageal, lymphoma, prostate; 8 – Cervical, Breast, Head and neck, Vulvar, Kaposi's sarcoma, Endometrial, Penile, Anal, Oesophageal, Lymphoma, Prostate; 9 – Uterine cervix, breast, head and neck, prostate, GIT; 10 – skin, breast, colorectal, gynecologic, anal; 3 delays codes A – seeking care; B – reaching care; C – receiving quality care; S. Africa – South Africa; Retrospec – Retrospective; Prospect – Prospective; K. Sarcom – Kaposi Sarcoma; N – sample size.

The reasons of the delays amalgamated from the studies and identified as contributing to each type of systems delay are outlined in Table 2. They are further synthesized into economic, psychological, sociocultural, health services and geography subthemes and referenced appropriately in the text. The comprehensive output with outcomes of the data extraction is included as Appendix 2 in the supplementary material.

leasons for seeking care delay	Reasons for reaching care delay	Reasons for receiving quality care delay
	Psychological	
Belief in witchcraft	Preference for alternative treatment	Defaulting because of side effects of drugs
Denial		Declining treatment
Embarrassment		Fear of wasting doctor's time
Fear of being asked to stop habits e.g. smoking		Fear of treatment (e.g. mastectomy)
Stigma		Lack of consent
Secrecy		Preference to observe
Putting others needs first Prior bad experience at health centre		Preference for alternative therapies (herbal, Chinese, acupuncture, food supplements)
of hospital		
Preference for care abroad		
Lack of trust in health system		
Fear of doctors, diagnosis, dying, job loss, losing part of body, missing family commitments because of treatment, telling people of illness, treatment		
	Sociocultural	
Family and friends' disapproval	Family responsibilities	Communication barriers
Busy schedule	Lack of a caregiver to accompany to facilities	Family commitments
Anticipated long waiting time at	lacinues	Family communents
clinic	Obligations at home	Language barrier
Preference for prayers and spiritual intervention		No relative to care for them during treatment
Preference for food supplements/organic foods		Patients changing mobile numbers so cannot be contacted for further management
Preference for alternative therapies (herbal, homeopathy, Chinese, acupuncture)		Ignorance on available treatment
No one to look after children		
Low education		
Lack of personal initiative		
Ignorance on how to seek healthcare		

Impact of taking time off work	Dependence on others for transport	Cancer not priority
Anticipated armongs of treatment	Difficulty making appointment or	Failure to come back for follow up
Anticipated expense of treatment	reaching doctor	diagnostic or treatment appointments Failure to find accommodation as
Transport challenges (e.g. cost)	High cost of prediagnostic costs	outpatients close to treatment centre
Prioritising day to day survival over seeking help	High cost of transport	Financial incapability
Obligations at home	Inability to afford clinic visits	High cost of medicines
No health insurance	Lack of money (for transport)	Paying out of pocket expenses
Financial incapability	Work commitments	Poor nutrition
	Geography	
Distance		
Distance Travelled away from home (out of	Distance Lack of knowledge of estimated	
comfort zone)	distance to nearest service	
	Health service	
Lack of cancer awareness programs		
and screening	Lack of navigation in primary care Long investigation time at first	Absence of multidisciplinary team care Burn out and disinterest of health care
	contact	workers
	Misdiagnosis at lower levels	Diagnostic delay
	Was told by health care worker there	
	was no treatment for disease Turned away from clinics for	Chemotherapy stock outs
	arriving late	Few specialists
		High patient volume compared to
		resources Lack of continuity of care by same
		healthcare workers
		Lack of palliative care and counselling services
		Lack of pathology and screening services
		Lack of smoking cessation clinics
		Lack of specific appointments with specialists
		Unwelcoming, demotivated and uncommitted staff turn patients away
		Long appointments, waiting periods
		Misdiagnosis
		No bed space
		Not healthy enough to continue treatment
		Patients changing mobile numbers so
		cannot be contacted for further management
		Poorly trained staff
		Power outages
		Unavailability of treatment modality
		Surgeon/operating room unavailability
		Pre-referral diagnosis not communicated
		Poor collaboration amongst health care workers

Seeking care

Reasons for delays in seeking care included a lack of awareness about cancer and low health literacy which itself manifested fears, false perceptions and beliefs and embarrassment cancer.(26,28,31,32,35,37,38,40,42,42,44,51,55,58,60,64,65,67,70,71,73,77,78) There was also a preference traditional treatment from or faith-based healers.(27,30,32,35-38,42,44,46,48,49,51,55,57,58,65,70,71,77,78) Participants in the various studies recounted the belief they had not been sick enough or didn't have adequate money to justify abandoning their obligations (both financial and social)(26,27,29,31,37,38,42,45,51,52,55,56,58,72,77,78); they rather reassured themselves about the seriousness of symptoms (for example lumps) as the symptoms did not cause disability or pain in the early stages of disease and that it was self-limiting. (26,31,36-38,42,44,47,51,53,67,73,78) Additionally, not knowing where or how to enter the health system for symptoms before they cause life threatening conditions contributed to delays in seeking treatment. (31, 37, 44, 46) The unknown costs of managing cancer was also noted to intimidate patients and delay presentation as a result.(26,44)

Reaching care

The physical distance to appropriate care was cited as a major barrier for patients who have to take into consideration transport costs to specialist facilities, accommodation and subsistence costs.(23,27–29,32,33,37,40–42,47,50–52,55,56,60,62,71–73,77,78) Even when transport is made available, they carry the cost of being away from their jobs and families. Other than geographical distance, low levels of cancer care knowledge amongst primary level healthcare staff was also a barrier for referral of patients.(31,37,45,70,74,78) This was identified as a source of misdiagnosis and underlay the lack of recognition for the urgency of transferring care to tertiary institutions. In one study, participants had reported that they had been misinformed at the primary level that their condition was incurable.(38)

Receiving quality care

The paucity of infrastructure, equipment, medication and human resources needed for cancer care underpinned the barriers to receiving quality cancer care.(28,62,69) We noted a lack of availability or poor quality diagnostic equipment and treatment facilities were also challenges identified.(58,62,70) Other factors included demotivated and burnt-out staff and the lack of specialist training of staff in cancer.(25,28,31,32,38,56,62) Tensions and mistrust of the system as a whole between the patients and healthcare providers operating in constrained environments were reported as contributing to factors that drove patients to alternate medicine or even simply abandon treatment.(31,47,52) In addition, the lack of availability of essential resources lead to high prices and catastrophic out of pocket expenses for the patients.(23,29,31,32,36,42,47,49,52,55,56,61,62,76,77)

Discussion

The impact of delays in the cancer care pathway on persistent high mortality rates are well recognized. Countries in SSA are called upon to accelerate the establishment and implementation of their cancer control plans and it is pertinent to recognize that whilst respecting the unique aspects of each nation, utilization of a common knowledge base avoids duplication and allows for prudent efficient use of scarce resources.(2,16) In this regard, results from research using a robust methodological approach provides a foundation for common knowledge that is applicable broadly.(17)

However, our systematic review of studies in SSA investigating the barriers to access to cancer care demonstrates a very limited number of studies despite the importance of this subject area, with heterogeneity in study design which limits their translational impact. The publications we found were clustered to the Northern and West African regions and given the heterogenous factors influencing the SSA region data cannot reliably be extrapolated across the continent. In addition, 70% of the studies focused on breast and cervical cancer with major causes of cancer related mortality and morbidity such as prostate and

esophageal cancer not addressed which is of major concern. The results highlight the need for a coordinated approach to manage these evidence gaps with no studies addressing the barriers to diagnosis and treatment of cancer identified in 35 of 48 countries in SSA.

The capacity to conduct robust research is increasingly possible across countries in SSA but it requires considerable efforts to coordinate these resources to support a common agenda based on country and regional level priorities.(80,81) Presently, a discordance between research needs and research funding priorities across the continent has been accelerated by the synthetic external agendas in individual countries rather than supporting endogenous solutions driven by those experiencing the problems.(82,83) This is exemplified by our findings which show research is concentrated on a pool of 4 or 5 better resourced countries and two main tumour types likely related to the availability of external funding.

Most published data have been obtained through cross sectional surveys, which detail the prevalence of reasons for delays but fail to account for important cofounding factors and system level processes to enable the effective problem solving. None the less they still provide a valuable baseline insight that we integrated into a "Three delays" model.

The common roots of the reasons for delays at each level of seeking, reaching, and receiving quality care as listed in Table 2. are firstly fear (apprehension or mistrust) and secondly, a lack of resources (financial, human or infrastructure). Across all delays cost is a major factor that influences the interval between the stages in the cancer pathway. Out of pocket expenses are high with patients requiring cover for transport, accommodation, diagnostic tests and medicines. A significant number of patients live under the poverty line and it may seem unrealistic for the families to spend on what is perceived to be an incurable disease in the first instance.(84) A recent study demonstrated the threat of catastrophic health expenditure that accompanies a cancer diagnosis even with the basic drugs in Low and Middle Income Countries (LMICs).(85)

In seeking care, fear is compounded by the lack of awareness (knowledge) on the disease, availability of services or how to navigate the pathways to quality healthcare. It can drive patients to rely on familiar systems of alternative medicines (traditional healers, 'Chinese' medicine, Faith based healers). In addition to these challenges taking time off from work or domestic obligations to attend healthcare appointments is often relegated in terms of priorities due to financial and social implications. Societal expectations also create fear of stigmatism and promote secrecy that hinder free information flow between those seeking it and its custodians.

For reaching care the lack of adequate coordination of services was the dominant theme. Poorly trained staff or lack of support for primary health care practitioners delayed referrals to more specialized services and the health system in such a scenario could possibly discourage patients on the curability of the condition. Links and relationships are essential between primary and secondary/tertiary healthcare as most patients will present first to local clinics or health posts. This is particularly important where systems are not electronically linked for results to be easily attainable between practitioners.

To receive quality care, patients need access to a health care the system with appropriate human resource and infrastructure (diagnostic and treatment). A lack of human resource encompasses both the competence of the workforce for tertiary services as well as the actual low numerical value of specialized knowledgeable staff leading to burnout. Equally a skilled and competent workforce without appropriate infrastructure or sufficient medication and surgical supplies cannot be expected to deliver quality care. Another aspect to consider for receiving quality care includes patient factors like good nutritional status, financial capacity, and social capital to undergo treatment. Acceptance and adherence to treatment are also integral to a successful intervention as investigated by Anyanwu et al.(23)

The findings from our study suggests that reasons for delays are interlinked both at an individual level and population level (Figure 1). An individual with vulnerabilities at the seeking level phase would most likely experience repetitive barriers in reaching care as well as receiving quality care. An underdeveloped health system with poor linkages between primary health care and tertiary level care will inevitably have a large proportion of patients falling through the cracks between phases of care. This could be due to untimely referrals and inability to support diagnostic costs thereby relying on the patient to raise funds.

Limitations

A major limitation in the interpretation and application of the findings of this research output is the quality of the included studies. Recognition of this limitation and application of additional triangulation has assisted us to utilize what is available in this space. Future directions based on our findings would be to conduct more research studies that will provide quality data for policy formation and effective implementation.

Conclusion

To see a reduction in cancer mortality in SSA health systems need to address delays within the cancer pathway from initial presentation and appraisal to completion of treatment and the survivorship pathway. Holistic support for the patient as well as the workforce across the continuum and longitudinally in each phase is important to achieve good outcomes. Cognizance of the multiple barriers present for individual patients from developing a cancer to its treatment is important for policy makers and experts to build resilient and effective cancer control programs. With an individual in mind an effective population approach can be achieved. Due to the paucity of organized data in SSA, the starting point of research is often extrapolated from other regions who have different realities. In carrying out this systematic review we intend to provide an organized pool of information that will provide a robust resource for other researchers seeking to conduct studies in SSA.

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 Figure 1. Three delays framework
 Figure 2. Flowchart of study selection
 Figure 3. Quality assessment of studies (n= 14) deemed essential by oncologists in 82 countries: an international, cross-sectional survey. Lancet Oncol

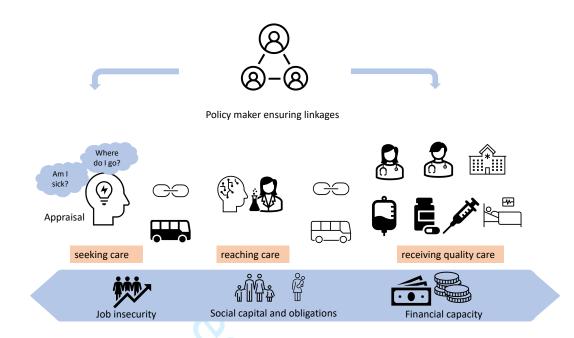


Figure 1: Three Delays Framework

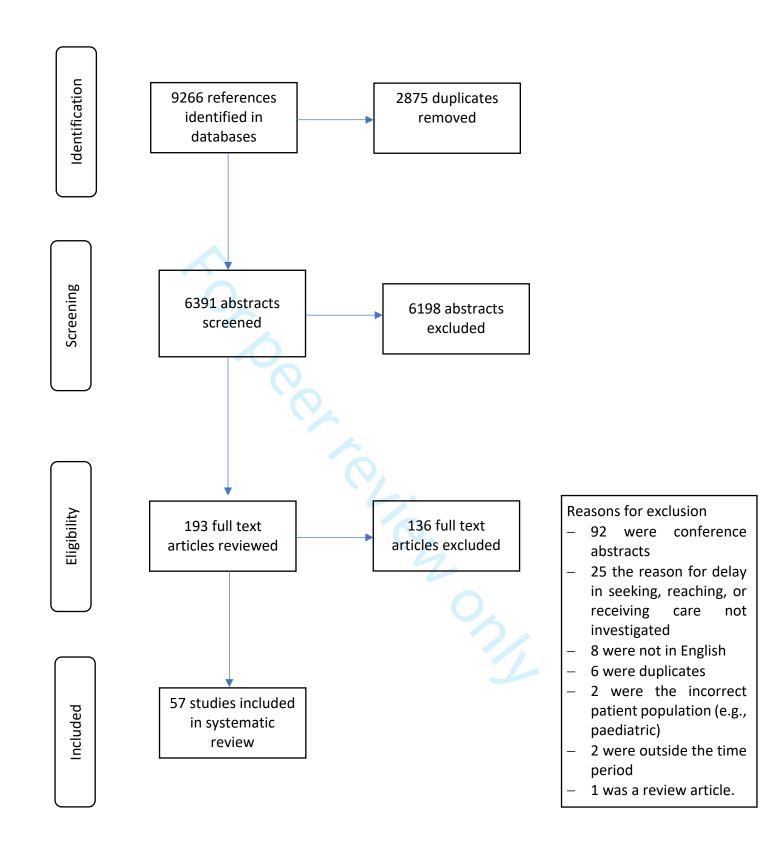
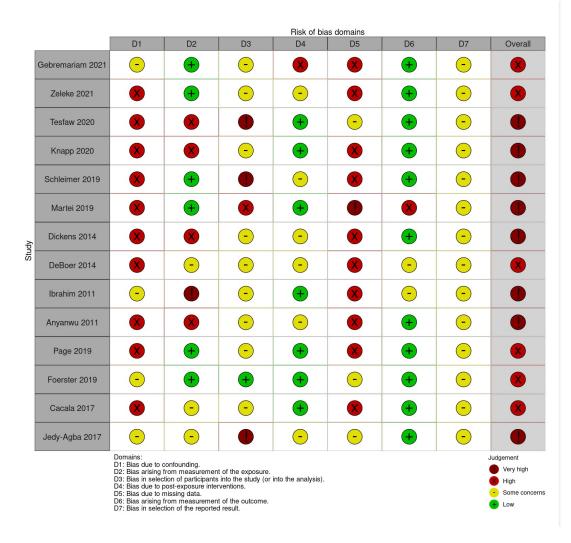


Figure 2. Flowchart of study selection as per Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidance



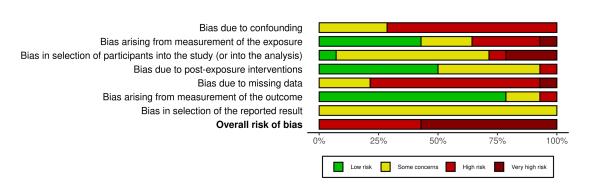


Figure 3. Quality assessment of studies , n=14.

McGuinness, LA, Higgins, JPT. Risk-of-bias VISualization (robvis): An R package and Shiny web app for visualizing risk-of-bias assessments. Res Syn Meth. 2020; 1-7. https://doi.org/10.1002/jrsm.1411

Systematic review	
Databases	PubMed
Search terms	Synonyms
1. Cancer	cancer OR tumour OR tumor OR neopla* OR malignan* OR
ti,ab	carcinoma
2. Delay	barrier* OR delay* OR access OR late OR interval
ti, ab	
3. Diagnosis and	diagnos* OR presentation OR intervention OR referral OR
treatment	consult* OR treatment OR therap*
ti, ab	
4. countries	angola OR benin OR botswana OR burkina faso OR burundi
ti,ab	OR cameroon OR cameron OR cape verde OR cabo verde OR
	central african republic OR ubangi shari OR chad OR
	comoros OR comoro islands OR iles comores OR congo
	brazzaville OR congo democratic republic OR democratic
	republic of congo OR congo OR zaire OR cote d ivoire OR
	cote divoire OR ivory coast OR djibouti OR french
	somaliland OR equatorial guinea OR eritrea OR ethiopia OR
	gabon OR Gabonese republic OR gambia OR ghana OR gold
	coast OR guinea OR guinea bissau OR kenya OR lesotho OR
	basutoland OR liberia OR madagascar OR malagasy OR
	malawi OR nyasaland OR mali OR mauritania OR mauritius
	OR mozambique OR namibia OR niger OR nigeria OR
	réunion OR rwanda OR Ruanda OR sao tome OR principe OR
	senegal OR seychelles OR sierra leone OR somalia OR south africa OR south sudan OR sudan OR swaziland OR tanzania
	OR tanganyika OR togo OR togolese republic OR uganda OR
	zambia OR zimbabwe OR africa OR african
5. Qualitative search	qualitative* OR narrative* OR interview* OR focus group*
terms	OR grounded theory*
CI III3	on grounded theory

Systematic review	
Databases	EMBASE
Search terms	Synonyms
1. Cancer	cancer:ti,ab OR tumour:ti,ab OR tumor:ti,ab OR neopla*:ti,ab
ti,ab	OR malignan*:ti,ab OR carcinoma:ti,ab
2. Delay	barrier*:ti,ab OR delay*:ti,ab OR access:ti,ab OR late:ti,ab OR
	interval:ti,ab
3. Diagnosis and	diagnos*:ti,ab OR presentation:ti,ab OR intervention:ti,ab
treatment	OR referral:ti,ab OR consult*:ti,ab OR treatment:ti,ab OR
ti, ab	therap*:ti,ab
4. Sub-Saharan Africa	angola:ti,ab OR benin:ti,ab OR botswana:ti,ab OR 'burkina
ti, ab	faso':ti,ab OR burundi:ti,ab OR cameroon:ti,ab OR
	cameron:ti,ab OR 'cape verde':ti,ab OR 'cabo verde':ti,ab OR
	'central african republic':ti,ab OR 'ubangi shari':ti,ab OR
	chad:ti,ab OR comoros:ti,ab OR 'comoro islands':ti,ab OR
	'iles comores':ti,ab OR 'congo brazzaville':ti,ab OR 'congo
	democratic republic':ti,ab OR 'democratic republic
	congo':ti,ab OR congo:ti,ab OR zaire:ti,ab OR 'cote
	divoire':ti,ab OR 'cote d ivoire':ti,ab OR 'ivory coast':ti,ab OR
	djibouti:ti,ab OR 'french somaliland':ti,ab OR 'equatorial
	guinea':ti,ab OR eritrea:ti,ab OR ethiopia:ti,ab OR gabon:ti,ab
	OR 'gabonese republic':ti,ab OR gambia:ti,ab OR ghana:ti,ab
	OR 'gold coast':ti,ab OR guinea:ti,ab OR 'guinea bissau':ti,ab
	OR kenya:ti,ab OR lesotho:ti,ab OR basutoland:ti,ab OR
	liberia:ti,ab OR madagascar:ti,ab OR malagasy:ti,ab OR
	malawi:ti,ab OR nyasaland:ti,ab OR mali:ti,ab OR
	mauritania:ti,ab OR mauritius:ti,ab OR mozambique:ti,ab OR
	namibia:ti,ab OR niger:ti,ab OR nigeria:ti,ab OR réunion:ti,ab
	OR rwanda:ti,ab OR ruanda:ti,ab OR 'sao tome':ti,ab OR
	'principe':ti,ab OR senegal:ti,ab OR seychelles:ti,ab OR
	'sierra leone':ti,ab OR somalia:ti,ab OR 'south africa':ti,ab OR
	'south sudan':ti,ab OR sudan:ti,ab OR swaziland:ti,ab OR
	tanzania:ti,ab OR tanganyika:ti,ab OR togo:ti,ab OR 'togolese
	republic':ti,ab OR uganda:ti,ab OR zambia:ti,ab OR
	zimbabwe:ti,ab OR africa:ti,ab OR african:ti,ab
5. Qualitative search	qualitative*:ti,ab OR narrative*:ti,ab OR interview*:ti,ab OR
terms	focus group*:ti,ab OR grounded theory*:ti,ab

Title, Author, Year of publication	cancer type	Setting Country	Data collection timeframe	Participants	size and	Patient factors	Distance from hospital	Reasons for delay and outcomes
Stock Outs on Cancer Therapy	cervical breast prostate esophageal lung uterine ovarian colorectal head and neck cancers Kaposi sarcoma	Hospital Botswana	1st January 2016 to 31st December 2016	Patients	design 286 Retrospec tive cohort	Male 77 Female 180 Unknown 29<6Syrs =217 > 65yrs=61 Unknown =8		each week of stock out was strongly associated with a suboptimal therapy delivery event ALI(OR, 1.81; 95% CJ, 1.62 to 2.02). Every week of stock out duration was associated with an almost two-fold increased risk of a suboptimal therapy delivery event (OR, 95%CJ, 1.7 t. 2.13;P, 0.01). - patients receiving treatment regimens for colon (OR, 6.34;95% CJ, 3.11 to 12.9;P, 0.01) or rectal cancer (OR, 7.07;95% CJ, 1.83 to 27. 1.004) were at the highest risk of an event after adjusting for stock out, whereas those with prostate cancer were less likely than to counterparts to experience a suboptimal therapy delivery event (adjusted OR, 0.24;95% CJ, 0.81 OO, 79;P= 0.19 11.048574 measured exposure was chemotherapy stock out, quantified as the duration of chemotherapy stock out within a cycle interval. - Stock-out duration was calculated by counting the days from the date the drug was out of stock to the date it was recorded as being in stock. - The primary outcome, suboptimal therapy delivery, was defined as any of the following events: any dose reduction, at least 1-week in receipt of therapy, any missed dose, and any switch in intended therapy. - A majority of the patients with stage information had either stage ill or IV disease. Of patients with known intent of treatment, 515 receiving curative regimens and 49% were receiving noncurative regimens -chemotherapy stock outs
Patient Factors Associated With Delays in Obtaining Cancer Care in Botswana. Rhine K Bhatia 2018	All cancers Cervical 90 (42.3%) Breast 34 (16.0%) Head and neck 34 (16.0%) Head and neck 34 (16.0%) Styloar 14 (6.7%) Styloar 14 (6.7%) Endometrial 7 (3.3%) Penile 5 (2.4%) S(2.4%) Oesophageal 5 (2.4%) Lymphoma 3 (1.4%) Prostate 1 (0.5%)	Hospital Botswana	December 2015 - January 2017	Patients	214 Questionn aire	not stated not stated single 132 (62.9%) (62.9%) Married 47 (22.4%) serious or live-in 16 (7.7%) Separated/ widowed 15 (7.1%) None 28 (16.2%) Primary 59 (34.1%) Secondary 70 (40.5%) Tertiary or above 16 (9.3%) Women 173 (81.3%) Men 41 (19.2%) median age of 46 years (21.95 years)	5-50 km 67 (32.7) 51-200 km 61 (29.8) 201-400 km 34 (16.6) > 400 km 43 (30.0)	English literacy: Can read in English, p=0.042 OR 2.32; Cancer diagnosis site: Breast p=0.017 OR 3.73; Head and neck p=0.017 OR 93.73Predominantly female cancer p=0.015 OR 0.452; Relationship status: separated/widowed p=0.032 OR 0.3Appraisal delay; Femi p=0.032 OR 0.45; Education level: primary schooling p=0.057 OR 0.367; Distance from PMH (201-400 km) p=0.056 OR 2.5; Cancer diagnosis tite Kaposi sarcoma p=.0010 RP 9.77; Penile cancer p=0.029 OR 8.41; Symptom seventry A little serious p=0.001 OR 0.14; Very serious p=0.002 OR 0.402; Predominantly female cancer p=0.005 OR 0.4; Help-seeking delay No. of family members: 4.10 p=0.03 OR 0.314; Symptom seventry. help-seeking delay No. of family members: 4.10 p=0.03 OR 0.314; Symptom seventry. very serious p=0.012 OR 0.384; Cancer diagnosis site: Vulvar p=0.02; Symptom seventry. very serious p=0.012 OR 0.384; Cancer diagnosis site: Vulvar p=0.02; Symptom seventry of symptoms, p=0.011 OR 4.688eliefs: - declining treatment: getting cancer is part of God's plan p=0.0416 - 28/115 (2.74%) Appraisal - sex. p=0.030: male 16 (33%); female 39 (22.25%) - seventry of symptoms, p=0.066: not serious 22 (44.5%); a little serious 4 (10.3%); moderately serious 5 (21.7%); serious 5 (23.8%) v - seventry of symptoms, p=0.066: not serious 22 (44.5%); a little serious 4 (10.3%); moderately serious 5 (21.7%); serious 5 (23.8%) v - cancer site, p=0.011:Cenvical 14 (15.6%); vluvar 5 (33.3%); Anal 1 (20%); Head and neck 9 (26.5%); Penile 3 (60%); Breast 8 (23.5%) tymphoma 2 (66.7%) Gesophageal 2 (40%) Kaposi sarcoma 9 (64.3%) Endometrial 2 (28.6%) Prostate 0 - serious 19 (26.7%) Gesophageal 2 (40%) Kaposi sarcoma 9 (64.3%) Endometrial 2 (28.6%) Prostate 0 - serious 19 (26.7%) Gesophageal 2 (40%) Kaposi sarcoma 9 (64.3%) Endometrial 2 (28.6%) Prostate 0 - serious 19 (26.7%) Gesophageal 2 (40%) Kaposi sarcoma 9 (64.3%) Endometrial 2 (28.6%) Prostate 0 - serious 19 (26.7%) Gesophageal 2 (40%) Kaposi sarcoma 9 (64.3%) Endometrial 2 (28.6%) Prostate 0 - serious 19 (26.7%) Gesophageal 2 (40%) Kaposi
Factors related to advanced stage of cancer presentation in Botswana Childinma Anakwenze 2018	Response rate 99.53% n=220. cervical 90 breast 32, head and neck 42, vulvar 15, kaposi sarcoma 14, endometrial 7,penile 6, anal 5, esophageal 5,lymphoma 3 prostate 1	Hospital Botswana	December 2015 to January 2017	Patients	214 Questionn aire	Single early 41 (19.5%) late 40 (19.0%) unknown =51 (24.3%) Married/in a serious relationship early 9 (4.3%) late 24 (11.4%) unknown 22 (10.5%) Living with a partner early 3 (1.4%) late 4 (1.9%) stage 1 (0.5%) Divorced/separated/wi dowed early 3 (1.4%) late 6 (2.9%) stage 6 (2.9%) stage 6 (2.9%) stage 6 (3.4%) late 16 (3.4%) late 11 (6.3%) unknown 11 (6.3%)	5-50 km early 15 (7.3%) late 29 (14.1%) unknown = 23 (11.2%) 51-200km early 20 (9.7%) late 19 (9.2%) unknown 22 (10.7%) 201-400km early 12 (5.8%) late stage 7 (3.4%) unknown 15 (7.3%) > 400 early 19 (4.4%) late 19 (9.2%) late 19 (9.2%) Unknown 15 (7.3%) Vnable to locate village unknown 1 (0.5%)	- not afraid of having cancer OR, 3.48; P < .05 - no family to care during treatment OR, 6.35; P = .05 - could not afroit to develop cancer (OR, 2.73; P < .05) - belief use of contraceptive pills or injections causes cancer OR (0.72 P=0.02) - belief using hormone replacement pills after menopause can cause cancer OR (0.96 p=0.01)-Transportation problems; - Dependent on others for transportation
Factors associated with delays to surgical presentation in North-West Cameroon Chao Long 2015	-skin -breast -colorectal -gynecologic -anal		23rd June2014 - 5th August 2014	Patients	220 Other: cross sectional	-less than primary school completed 37(16.8%) -completed primary school 115 (52.3%) -completed primary school 115 (52.3%) -secondary school or higher education completed 68 (30.9%)134 Males 86 females -cancer cohort had 19 males and 40 females15 to 20 yrs 4 21 to 29 yrs 7 30 to 39 yrs 7 40to 49 yrs 8 50 to 59 yrs 14 60 to 69 yrs 13 70 to 79 yrs 5 80+ yrs 1		-thought another health care provider could provide adequate or better care -Lack of knowledge about MBH hospital -cost of hospital fees -need for first alig/mergency care at the nearest facility -in ability to participate in care decisions due to mental state -transportation - inability to take time from work/commitments -belief that they were not sick enough -belief that they could treat themselves
Late-Stage Diagnosis and Associated Factors Among Breast Cancer Patients in South and Southwest Ethiopia: A Multicenter Study Aragaw Tesfaw 2020	Breast	Regional Ethiopia	January 2013 - December 2017	Patients	426 Retrospec tive cohort	not stated not statednot statednot statedMale 28 (6.6%) Female 398 (93.4%)mean 42.78 +/- 13.4	not stated	- breast lump or mass as the chief complaint were 3 times more likely to be diagnosed with late-stage disease than those who did (AOR= 3.01; 95% CI, 1.49-6.07) late-stage disease: -rural communities 224 patients (73%), urban areas 85(28%) -female patients (74.4%), male patients 46.4% -long patient delay 240 patients (77.2%) -long total delay vs short total delay (77.4% vs. 67.3%, respectively,P<.05) not statednot statednot stated
Factors associated with delayed diagnosis of cervical cancer in tikin anbesa specialized hospital, Ethiopia, 2019: Cross-sectional study Shegaw Zeleke 2021	Cervical	Hospital Ethiopia	not stated	Patients	410 Other: case note review and interview	Farmer 182 (44.4 %) Governmental 27 (6.6%) Private 54 (13.2%) Unemployed 147 (35.9%) not statedMarried 285 (69.5%) Single 11 (2.7%) Divorced 36 (8.8%) Widowed 78 (19.0%) Cannot read and write 205 (50%) 100% Femalemean age 50 years (4'-11.5)	<100 km 106 25.9% >100 km 304 74.1%	not statednot statednot statednot stated- Accept as cancer cannot heal - Go to traditional healers - Difficulty of decision - Can be healed by itself - Given priority for other diseases - Embarrassment - Unawareness of cervical cancer health service access

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1								
2 cleayed initiation of adjuvant chemotherapy among women with breast cancer in Addis Ababa, Ethiopia Alem Gebremariam 2021 4 5 6 6 7 8 9 10 11 1 12 12 13 1	Breast	Regional Ethiopia	January 2017 - December 2019	Patients	223 Other: Retrospec tive review and interview s	Homemaker 102 (45.7%); Employed (governmental and private) 79 (35.4%); Daily laborer 29 (12.9%) Other (retired, no job)13 (5.7%) < 61.0 US dollar 58 (26%) 61.0 94.0 US dollar 58 (26%) Most statedilliterate 37 (16.6%); Primary school 60 (26.9%); Secondary school 69 (30.9%); Diploma and above 57 (25.6%)100% femalec40 years 104 (46.6%); 40-49 years 51	not stated	- the risk of delay was significantly higher among women with lower monthly family income, p=0,002 - Women with a monthly income of USS-61.0 had a three times higher risk of delay (RR=3.98; 95% CI 1.67-9.46) compared to those women with a family monthly income of US\$>194Not statedNot
13 Adherence to Newly 14 Implemented Tamoxifen 15 Patients in Rural Western 16 Ethiopia Christian Felix Rebold 17 18	Breast	Hospital Ethiopia	January 2010 - December 2015	Patients	51 Other: questionn aire and interview s	Housewife 28 (57%) Farmer 17 (35%) Student 1 (2%) Other 3 (6%) not statedMarried 38 (93%) Not married 3 (7%)Literate (n = 38), No 31 (77%) Ves 9 (23%) 100% femalemean 45 years (35-51)	not stated	not statednot statednot stated- lack of consent - problems on the health care provider side (12; 48%) where patients had not been given an appointment (n = 9), the physician was absent (n = 2), and there (n = 1). - Reasons on the patient side (13; 52%) included lack of money (n = 2), too weak to travel (n = 1), fear of treatment (n = 1), and private reasons (n = 1). - No information was available for 8 patients. not statednot stated
Tactors associated with 20 advanced stage at diagnosis of carvical cancer in Addis Ababa, 21 Ethiopia: A population-based study Neblyu Dereje 2020 22 23 24		Regional Ethiopia	1st January 2017 to 30th June 2018	Patients	aire, case	<3200 ETB =142 (67.5%) monthly >3200 ETB =69(32.5%)- No formal education 86 (40.6%) - 'Yes formal education 126 (59.4%) Female =212-40 yrs=42 (19.8%) 40.59 yrs=103 (48.6%) >60 yrs =67 (31.6%)		Religous practices/Did nothing APR=1.25, 95% CI: 1.05 to 1.53 , p=0.02 -visited >3 different healthcare facilities prior to diagnostic confirmation APR=1.24, 95% CI: 1.08 to 1.91 p=0.01 - Out of pocket medical expenses APR 1.44 (1.08.4-91), p=0.03 not stated -visiting more than three different health care facilities before diagnostic confirmation-medical expenses -not going to facility immediately after symptom recognition
25 Extent and predictors of delays in diagnosis of exervica causes of	Cervical	Regional Ethiopia	1st January 2017 to 30th June 2018	Patients	231 Questionn aire	-Housewife =114 (62.3%) -Government employed =29 (12.6%) -Frivately employed =23 (10%) -Merchant =10 (4.3%) -Daily laborer =13 (5.5%) -Pensioner =8 (3.5%) -Pensioner =8 (3.5%) -Pensioner =8 (3.5%) -Fit = 35 (15.2%) -Fit = 35 (15.5%) -Fit = 35 (15		The odds of diagnostic delays: - contacted primary-level health facilities (health centers and private clinics as compared to contacted secondary- or tertiary-level health facilities (AOR, 2.6; 95% CJ, 1.33 to 5.27) patients who visited, > 4 different health facilities for their cancer diagnosis as compared to those who visited, < 4 different health facilities (AOR, 2.7; 95% CJ, 1.07 to 6.71) patients who made 5 visits to health facilities before receipt of histologic diagnostic confirmation compared to those patients who made 5 visits (AOR, 2.2;95% CJ, 1.05 to 4.43) - The odds of delay in health seeking: - never heard of cervical cancer before diagnosis (adjusted OR (AOR), 2.3; 95% CJ, 1.11 to 4.70) - valted until they saw additional symptoms (AOR, 2.39% CJ, 0.96 to 4.90) - practiced a religious ritual as a solution for their cancer (AOR, 3.3; 95% CJ, 1.46 to 7.48) - Not bothered about first symptom 16 (29.6%) - Thought religious mayer by tiseff 21 (38.9%) - Misinterpretation (not aware) of symptoms 14 (25.9%) - Misinterpretation (not aware) of symptoms 14 (25.9%) - Not knowing which health facility to visit 8 (14.8%) - Thought religious activities would cure problem 5 (9.3%)
37 Socio-economic and cultural vulnerabilities to cervical 38 patients attending care at Tilum 39 sacreta based by a sectional and qualitative study 40 Sara Kebede Tadesse 2015 41 42 43 44 45 46 47 48		Hospital Ethiopia	2013	Patients	aire and interview	Indusewife 78 (39.4%) Government 13 (6.6%) Merchant 12 (6.1%) Merchant 12 (6.1%) Merchant 12 (6.1%) Persioner 8 (4.0%) Daily laborer 2 (1.0%) NGO 1 (0.5%) Unemployed 1 (0.5%) SOO 43 (23.9%) Unemployed 1 (0.5%) SOO 999.99 77 (42.8%) (1.000 - 1.499.99 29 (16.1%) 1,500 - 1.999.99 19 (10.6%) 2,000 or more 12 (6.7%)Single 1 (0.5%) Married 101 (51.0%) Widowed 69 (34.8%) Separated 19 (9.6%)		not statednot statedlong waiting timemisdiagnosisnot clear
Patient delay and contributing factors among breast cancer patients at two cancer referral contributions and two cancer referral sectional study Aragaw Tesfaw 2020 52 53 54 55 56 57 58	Breast	Regional Ethopia	September 2019 to April 30 2020	Patients	371 Questionn aire	Housewife 215	<5 km 163 (43.9%) >5 km 208 (56.1%)	not stated- more than 5 km travel distance (AOR=1.66; 95% Cl=1.09-3.00)- rural residence (AOR=3.72; 95% Cl=1.82-7.AF2561). - Illiterate women (AOR=3.8; 95% Cl=1.93-5.72) - painless wound (AOR=3.32; 95% Cl=1.93-5.72) - no lump/swelling in their armpit (AOR=6.16; 95% Cl=2.80-13.54). - no previous breast problem (AOR=2.46; 95% Cl=1.43-4.22) not statednot stated- Lack of awareness about early symptoms 345 (92.9%) - Relating symptoms with other medical problems 132 (35.6%) - Belief that breast cancer has not any medical treatment 88 (23.7%) - Use of traditional and spiritual treatment options 286 (77.1%)

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Description of the control of the	1									
Mark Supplement Supplemen			breast			Patients				
Company		treatment in Ghana? A pilot		Citatia	July 2000			(5.7%)		-Herbal treatment 13 (37.1%),
Part	3	study. J. Clegg-Lamptey 2009								
The content of the	4									-Chinese medication 5 (14.3%)
Manufacture Color	5									-Ulcer healed. Thought disease was healed 2 (5.7%),
Part	-									-Had complete clinical response 2 (5.7%),
Report of Control Cont	6							patients 22 (18.2%) -		exercising faith 2 (5.7%)
	7									
	Q							(14.3%)		- Father refused treatment 1 (2.9%),
Comparison of the comparison	-									
Proceed and continued in the continued	9							5 (14.3%)		-Financial incapability
The control of the	10									
Part	11									
Part								22 (33.3%) 5 (14.3%)		-prayers and prayer camps 13(19.7%),
An expectation of the control of t	12									
Process controlling a status control of the contr	13							44.8, median 43 yrs		-other spiritual 6(9.1%)
1	_	Factors contributing to delays	Breast cancer		-	Patients				
1	- 1	in Ghana, West Africa Louise		Citatio				40-44 158 (13.3%)		-divorced/separated OR 1.65 (1.15-2.37) or widowed women OR 2.16 (1.42-3.28)
Column C	15	Brinton 2016								-Consulting a traditional healer and using traditional medication
18	16							55-59 150 (12.7%)		
Marchest Michael Marchest Mi										
Common control Comm								>70 = 95 (8.0%)		
	18	Einancial barriers ' · ' ·	Broast	Bog! '	November 2017	Datit	900			Cost of going to the elector AC 39/
Proceedings Process	19	breast cancer screening and	preast			ratients		without BC 258 -		-Inability to discuss symptoms confidently 10.0%
Approach large Second Control Approach		treatment: A cross-sectional					aire			
Proceedings	-	Sujha Subramanian 2019						-Married/ living		-Fear of wasting the doctor's time 3.3%
22 3 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	21									
Wilder State Column Colu	22							-Divorced/ separated:		-Busy schedule 9.0%
See a service of the first of the second was the distance of t										
Proceedings of the control of the						1		without 30		-Fear of what the doctor might find 19.3%
Windows Company Comp	24									-General rear of the doctors visit 19.3%
The contract of the contract o	25									
Total Control Colors afficing Total Colors (Colors afficing)								- Primary: With BC 136		
28 definition of these presentation of these	26							Without 101		
28 greater laters afficing a contact larger between the control fillings to treatment in a contact larger present or a contact larger present in a contact larger in a contact larger present in a contact larger	27							Secondary/Vocational:		
College System & Find	28									
Part Continue Co								-College05: With BC 70		
Somewhat the control and the precision of the control and the control	29									
Second processed for treatment of process of the control study Second processed pr	30				5.1		505	32 Without 26	01 (5.40)	
and the production of the prod	31	successful linkage to treatment	cervical cancer			Community	Other:	Yes 291(58% not	8 KM (5-12)	- women who did not miss work to come to CHC
3 Charlette M Page 2015 34 34 35 36 36 36 37 37 37 38 38 38 38 39 39 39 39 39 39 39 39 39 39 39 39 39										not statednot statednot stated
See	32	prospective conort study					e conorc	Partnered 366		
At least some electronic and Capacity of Tomore Capacitics and Tomore Capacitics Capacit	33	Charlotte M Page 2019								
10x3 10x0 10x3 10x0 10x3 10x0 10x3 10x0 10x3 10x3 10x3 10x3 10x3 10x3 10x3 10x3 10x3 10x3 10x3	34							At least some		
femalemental 3 (27- days from the process and of pr	-									
The content of clare and	35							femalemedian 33 (27-		
Teachment Command and Standard Standard Processing Standard Command and Standard Standard Command and Standard Standard Command and Standard Standard Command and Standard Comm	36							,		
Septiment. A bemand and supply story (Path-Care) Wormhaldas 2019 Protects Wormhaldas 2019 Protects Wormhaldas 2019 Protects Long Wormhaldas 2019 Protects Long Wormhaldas 2019 Protects Long Long Wormhaldas 2019 Protects Long Long Regional Long Regional Long Regional Long Regional Long Regional Long Mail National organization of protect in quality of the disasses of the disasses in protection of the disasses of the disasses in protection of the disasses in protectio	37								not stated	not statednot stated- preventive services limited not statednot stated
Wanishabab 2039 Wanishab			Esophagus,			and	patient	statedFemale 57%		
Manual part Color Thyroid Pancerand Color Pancerand	38	racilities ili keliya rialicis vv				rs adminstrato		years		
40 tuning tiver shows the same of the state of the same of the sam	39	Wambalaba 2019	Colon,			1	-			
ung, Liver volunteer patients survey data from the state of the state						1				
43 43 44 5 Delayed presentation of breast face presentation of breast services and particular transportation and particular tr			Lung,				volunteer			
45 Delayed presentation of breast cancer patients. E.S. Otleno 45 Delayed presentation of breast cancer patients. E.S. Otleno 46 2010 47 48 Health system organisation 49 medical doctors' practice in Mali Kirsten Grosse Frie 2019 50 51 52 53 54 55 65 56 57 57 68 69 60 60 60 60 60 60 60 60 60	41		E VCI			1	-survey			
45 Delayed presentation of breast cancer patients. E.S. Otleno 45 Delayed presentation of breast cancer patients. E.S. Otleno 46 2010 47 48 Health system organisation 49 medical doctors' practice in Mali Kirsten Grosse Frie 2019 50 51 52 53 54 55 65 56 57 57 58 69 60 60 60 60 60 60 60 60 60	42									
44 45 Delayed presentation of breast Breast cancer patients, E.S. Otieno 2010 Color						1	medical			
Delayed presentation of breast acre patients. E.S. Otieno 2010 April 2016 Ap	43					1	officers			
46 cancer patients. E.S. Otleno 2010 Kenya 31st March 2006 Kenya 41st March 2006 Kenya 4	44									
46 cancer patients. E.S. Otleno 2010 Kenya 31st March 2006 Kenya 41st March 2006 Kenya 4	45	Delayed presentation of hreast	Breast	Hospital	1 October 2003 to	Patients	166	98.8% femalemean		-Reassured that their condition was benign by the first medical personnel they visited 40 (24.1% cumulative %24.1)-Painloss
Health system organisation Health system organisation Health system organisation Health system organisation Agril 2016 April		cancer patients. E.S. Otieno					Questionn	age 47, age range 17		symptomatology 39 (23.5%, cumulative% 47.6)
Health system organisation and patient pathways: breast care patients' trajectories and medical doctors' practice in Mali Kirsten Grosse Frie 2019 50 51 52 53 54 55 65 57 1 January 2016 - Patients and patient pathways: breast care patients' trajectories and medical doctors' practice in Mali Kirsten Grosse Frie 2019 50 51 52 53 54 55 65 57 57 58 58 59 78 78 78 78 78 78 78 78 78 7	46	2010				1	aire	to 88		
48 Health system organisation and patient pathways: breast care patients' trajectories and medical doctors' practice in Mali Kirsten Grosse Frie 2019 50 51 52 53 54 55 56 57 57 58 59 50 50 50 50 50 50 50 50 50				<u> </u>						-Attending to traditional healers and taking herbal preparations 16 (9.6% cumulative % 77.1)
49 medical doctor's practice in Mall Kirsten Grosse Frie 2019 50 51 52 53 54 55 56 57 clinicians aire Public service 19 (15.3%); Business 9 (7.3%); Student 9 (7.3%); Student 9 (7.3%); Obvorced 7 (5.6%) Widowed 20 (16.1%)not stated/100% female 16- 24 4(21.39%); 35.49 47 (37.9%); 50.80 35 (28.2%) 57		Health system organisation	Breast						not stated	
Mall Kirsten Grosse Frie 2019 51 51 52 53 54 55 55 56 57 Mall Kirsten Grosse Frie 2019 (7.3%); Student 9 (7.2%); Other 32 (25.8%) not stated/Married 83 (66.9%) Single 14 (11.3%) Divorced 7 (5.6%) Widowed 20 (16.1%) not stated/100% female16- 24 42 (33.9%); 35.49 47 (37.9%); 50.80 35 (28.2%)		care patients' trajectories and			, <u>-010</u>			Public service 19		(p=0.028) knowledge about breast n/a-no health insurance
50 51 52 52 53 54 55 55 56 56 57	49	medical doctors' practice in Mali Kirsten Grosse Frie 2010								- traditional healer
51 (7.3%): (0ther 32 (25.8%) not stated/Married 83 (66.9%) 53 (66.9%) 54 (11.3%) Divorced 7 (5.6%) Widowed 20 (16.1%) not stated/00% female16- 24 42 (33.9%); 35.49 47 (37.9%); 57	50	10131611 010336 1116 2015						(7.3%);		
52 (25.8%) not 3 (65.9%) (65.9%) (11.3						1	Ī			
52 statedMarried 83 66.9%) Single 14 (11.3%) 504 Divorced 7 (5.6%) Widowed 20 (16.1%)not stated100% female16- 24 42 (33.9%); 35-49 47 (37.9%); 57 50-80 35 (28.2%)								Other 32		
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55 stated100% female16- 24 42 (33.9%); 35-49 47 (37.9%); 50-80 35 (28.2%) 57						1	Ī	Widowed 20		
56 57	55					1	Ī	stated100% female16-		
57						1	Ī	24 42 (33.9%);		
	5/			l						

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Geospatial barriers to healthcare access for breast cancer diagnosis in sub- Saharan African settings: The African Breast	Breast	Hospital Namibia Nigeria Uganda Zambia	September 2014 - September 2017	Patients	1518 Other: Interview	not stated not statednot statedPrimary school or less 681 (45%) Secondary/high school	not clear	not stated - rural residence OR:1.40, 95% CI: 1.06-1.84 - distance (OR per 50 km increment OR = 1.04, 95% CI: 1.00-1.09, P 0.048not stated-Cost of diagnostic tests/treatment - Transport - Hospital too far - Difficulty with making an appointment or reaching doctor
Cancer,ÄîDisparities in Outcomes Cohort Study Kayo Togawa 2020						509 (34%) Technical/university 328 (22%)100% womenmean 50 years (+/- 13 19-97)		-Other obligations/no permission from family member -Embarrassment -Pain or discomfort -Fear of dying/treatment -No trust in medicine/prefer traditional healer
with Breast and Cervical Cancers in Lagos University Teaching Hospital, Nigeria.	Breast 85 Cervical 20	Hospital Nigeria	April to June 2016	Patients	105 Questionn aire	Not stated <n9000 57 (54.3%) N9001-N18,00 24 (22.9%) N18,001-N50,000 15</n9000 	<30 min 3 (2.9%) 30 min-1h 23 (21.9%) 1-2 h 26 (24.8%)	-Systemic delay χ 2 8.1 p=0.0174-Patient delay χ 2 8.5p=0.0363 -Misdiagnosis at lower levels of health care χ 2 7.11 p=0.0077 -Delayed investigation time χ 2 14.88 p=0.0001 -Ignorance and lack of personal initiative χ 2 5.07 p= 0.0243
Opeyemi Awofeso 2018						(14.3%) N50,001-N90,000 7 (6.7%) N90,001-N150,000 1 (1.0%)	>2 h 53 (50.5%)	-unavailability of appropriate treatment modality-investigation time at first contact -insidiagnosis at lower level-signorance and lack of personal initiative -preference for alternative medicine -fear -myths and misconceptions
<u>2</u> 3						N90,001-N150,000 1 (1.0%) N150,000 1 (1.0%)Single 4 (3.8%)		
1						Married 86 (81.9%) Divorced/separated 3 (2.9%) Widowed 12		
5 7 8					Þ	(11.4%)None 7 (6.7%) Primary 26 (31.4%) Secondary 33 (31.4%) Post secondary 39 (37.1%)Females: 105		
	breast	Hospital	August - October	Patients	275	(100%)All - mean age Unemployed 124 (not stated	not stated marital status p=0.00-Age p=0.023 -ethnicity p=0.024 -marital status p=0.009High cost of medicine 71 (73.2%)Obligations at
Variables on Patient and Diagnostic Delay of Breast		Nigeria	2018		Questionn aire	45.1%) Employed 151		home 77 (91.7%) High cost of prediagnostic test 69 (82.1%)
Cancer at the Foremost Health Care Institution in Nigeria.						(54.9%) <18,000 99 (36%)		Earlier alternative treatment 66 (78.6%) High cost of transportation 13 (15.5%)Obligations at home 75 (77.3%)
Sunday O Olarewaju 2019			1			>18,000 176 (64%)Single 12 (4.4%)		High cost of transportation 74 (76.3%) Stigma of disease 71 (73.2%)
3						Married 193 (70.2%) Divorced/separated		Denial or anxiety 71 (73.2%) Fear of seeking medical advice 69 (71.1%)
1						19 (6.9%) Widowed 51 (18.5%)Primary 46		Earlier alternative treatment 52 (53.6%) Non-awareness of the disease 38 (39.2%) Fear of diagnosis 67 (79.8%)
						(16.7%) Secondary 87 (31.6%)		
5						Tertiary 142 (51.6%)100%		
7						femalemean 49 +/- 11.9		
3								
Acceptance and adherence to treatment among breast	breast	Hospital Nigeria	2004 to 2008	Patients	275 Case note	primary 215 (80%) high school/tertiary		- Declined any form of treatment 65 (37.6%) -Accepted single treatment modality 57 (32.9%)
cancer patients in Eastern Nigeria. Stanley N.C. Anyanwu						168 (60%) females 273		-Cost of drugs, laboratory expenses and transportation to the hospital No bed space
2011						male 2<30yrs 19 (6.9%)		-No relatives to care for them during treatment -distance Distance
						30-39 yrs 74 (26.9%) 40-49 yrs 77 (28.0%) 50-59 yrs 50 (18.2%)		
3						60-69 yrs 39 (14.2%) >70 yrs 16 (5.8%)		
	Breast	Regional	June 2017-May	Patients	420	Not stated Not stated	Not stated	-The PCI (median 106, 13-337) was significantly longer than the HSI (median 42, 7-150), Wilcoxon-Signed Rank test p= 0.0001.(paired t-tes
impact of delay on breast cancer progression in a black		Nigeria	2018		Questionn aire	married 285 (68 %)		mean difference 140 -±442 days (95% CI 95-186). -Most respondents disclosed early within 30 days (330 (81, 95% CI 77-85) and consulted FHP within 60 days (230 (60, 95% CI 53-63).
African population Olayide Agodirin 2020						widow 48 (11.5 %) single 23 (5.5		-Most: respondents had long PCI of > 30 days. 1-7 days in 91(25% (95% CI 20-29), 1-30 days in 134 (36 95% CI31-41) and > 30 days in 237 ou of 377(64 95% CI 59-68)The SCI was > 90 days in 293 of 401 (73% (95% CI68-77), 91-180 days in 70 of 401 (17% (95% CI 14-22)and > 180 days in 226 of 401 (56%
7						single 23 (5.5 %) separat/divorced 7		195% (15-16) -More respondents with big (> 5 cm) tumors received correct advice compared to those with small tumors(Risk difference 5.5% (95% CI 4.0))
3						(1.7389 %) unspecified 57		15).
						(13.3 %)tertiary 144 (34.3 %) secondary		no associations given- misdiagnosis - strike 4.0 (2.4%)
1						124 (29.5 %) primary 66 (15.7 %)		- Navigation in primary care 1.0 (0.6%) -Misdiagnosis/ investigations 46 (27.5%)
2						none 79 (18.8 %)		- Inisociagitos is investigations 40 (27.5%) - Financial constraint 33 (19.7%) - Family issues 2.0 (1.2%)
3						unspecified 7 (1.7 %)		- farminy sasses 2.0 (1.7%) - reassured by first home person or first health care provider 7.0 (4.2%) - distance 3.0 (1.7%)
1						420 females (100%)21- 30 = 16 (3.8%)		- financial constraint 18 (10.5%)- ignorance 6 (3.5%) - pregnancy/ lactation/ menopause 8 (4.6%)
						31-40 =92 (22) 41-50 =119 (28.2%)		- thought benign/thought will disappear 50 (29%) - small size 2 (1.2%)
Infrastructural challenges lead	- breast (37.5%),	Hospital	June 2017 to	Patients	186	51-60 =(92 22%) None 37 (19.9%)		- lump only 2 (1.2%)
to delay of curative radiotherapy in Nigeria Jim	- cervical (16.3%), - head and neck	Nigeria	August 2017		Questionn aire	Trader 68 (36.6%) Farmer 9 (4.8%)		-inability to pay time to clinic visit OR=1.99 (1.05 to 3.77) P= .034* Time to radiotherapy treatment OR= 1.85 (0.95 to 3.57) Time to radiotherapy treatment p=.069
Leng 2020	(11.9%) - prostate (10.9%)		1			Artisan 23 (12.4%) Professional 38		-Infrastructural factors include; -Machine breakdown time to clinic visit OR=1.39 (0.78 to 2.48) P=.264 Time to radiotherapy treatment OR=2.92 (1.54 to 5.53) P=.001*
						(20.4%) Other 11 (5.9%) The		-Worker strike time to visit clinic OR= 0.65 (0.38 to 1.13) P= .127 Time to radio therapy treatment OR=2.64 (1.46 to 4.79)P= .001 -Power outage time to visit clinic OR=1.88 (0.8 to 4.42) P=.147 Time to radiotherapy treatment OR=2.81 (1.16 to 6.79) P= .022*
						median monthly income 15,000 naira (5,000 -		Sociocultural factors include; -Lack of knowledge of appropriate medical facility, time to clinic visit OR 4.96 (2.41 to 10.21),P=<.001* time to radiotherapy treatment OR=1.92 (0.89 to 4.15) P= .099
						(5,000 - 40,000N) which converts to		OR=1.92 (0.89 to 4.15) P=.099 -Not wanting others to know of sickness time to clinic visit OR 3.63 (1.35 to 9.72) P=.011* Time to radiotherapy treatment OR=1.75 (0.67 to 4.58) P=.253
<u> </u>			1			approximately 50 dollars per month.		10 4-36) F=.233 Tried another treatment first , time to clinic visit OR 2.45 (1.26 to 4.76) P=.008* Time to radiotherapy treatment OR= 1.50 (0.75 to 2.9) P=.248
3						Married 162 (87.1%), Widowed 12 (6.5%)		Fear of treatment , time to clinic visit OR 0.90 (0.5 to 1.63) P= .732 time to radiotherapy treatment OR 0.42 (0.22 to 0.81) P= .009*
1			1			Divorced 1(0.5%) Separated 1 (0.5%)		Concern over 50 of travel for treatment Time to clinic visit OR= 1.19 (0.7 to 2.04) P= .523 time to radiotherapy treatment OR= (0.3 to 0.95) P=.033*
			1			Never married 10 (5.4%)None 20		Pervious bad experience at hospital ,time to clinic visit 0R=7.05 (2.15 to 23.12) P= .001* time to radiotherapy treatment OR= 2.19 (0.0 to 7.09) P=.192
d l								
5						(10.9%) Primary 46 (25.0%)		throatment might be too expensive - Infrastructural barriers increased the odds of radiotherapy delay
5						(10.9%)		-treatment might be too expensive

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1									
Geospatial access cancer stage at pre and outcomes for p breast cancer in a Nigeria: A populati study Gregory C Kn	esentation patients with buthwest ion-based papp 2020			May 2009 - January 2019		tive cohort	not stated Socioeconomic status Low 417 (68.5%) Middle 185 (30.4%) High 7 (1.2%) not stated None 56 (9.3%) Primary 196 (32.4%) Secondary 141 (23.3%) Tertiary 212 (35.0%) Female 598 (98.2%) Male 11 (1.8%) median 49 (40-58)	not stated	not stated- primary education only (21.9%; P=.002) - longer travel time 2.8-fold increased (95% CJ, 1.30-6.11; P=.006) not statednot statednot statednot stated
Occomplementary an alternative medicir challenges among gynaecological can in Nigeria: Experier 12 Nwankwo 2019 13 14 15 16 17 18	ne. Use and of excerpatients vinces in a cituition - T.O.	iervical 42, warian 31, indometrial 8, ulva 5, horiocarcinoma , eiomyosarcoma 4	Hospital Nigeria	June 2014 to June 2020	rauents	aire	Trader 37 (38.9%) Artisan/farmer 23 (24.2%) Professional/Civil servant 18(19.0%) Unemployed17 (17.9%) Income < monthly expenses 59 (62.0%) Income = />monthly Expenses 36(38.0%)Single 13(13.7%) Married 77(81.1%) Divorced /separated 5 (5.3%) Primary/non formal 44 (46.3%) Secondary 28 (29.5%) Tertiary(23 (24.2%) 21-302 (2.1%) 31.40 17 (17.9%) 31.40 17 (17.9%) 50 49(51.6%)		-recommendation from friends and relatives (pvalue = 0.017 - income was less than monthly expenditure - duration of illness was equal or greater than six months pvalue = 0.02, OR = 0.36 CI 0.15-0.86-Complementary and alternative medicine use - Herbs - spiritual sacrifice diet modification - Chinese medicine - prayers combined with other methods - prayers combined with other methods
20 Effect of sociodem variables on patien diagnostic delay of cancer at the foren cancer at the foren sound of the cancer at the foren cancer	nt and breast most health Nigeria	reast		August - October 2018	Patients	Questionn aire	Unemployed 124 (45.1%) (45.1%) (19.1%)	not stated	not stated-marital status, p=00 (single at higher risk of late stage diagnosis)-Age p=0.023 -ethnicity p=0.024 -marital status p=0.009High cost of prediagnostic testObligations at home High cost of transportation n = 97 -Obligations at home -High cost of transportation -Stigma of disease -Denial or anwiety -High cost of medicine -Fear of seeking medical advice -Earlier alternative treatment -Nonawareness of the disease
31 impact of Primary in Progression of E 2 Cancer in a Black A Population: A Multi 33 Survey Olayide Ago 34 San	Breast African icentered			May 2017 -July 2018		aire	married 167(70.5%) single 11(4.6%) divorced or separated 4(1.7%) wildow 2(9.3%) unspecified 31(13.9%) etcondary 78(33%) secondary 78(33%) primary 30(12.7%) none 38(16%)<= 30 18(7.6%) 31.40 51(21%) 14.50 74(31.2%) 51.60 46(19.4%) 61-70 24(10.1%) >>7124(10.1%)		-Misdiagnosis
39 Health-seeking beh 40 barriers to care in jo with rectal bleedin 41 Olusegun I. Alatise 42 43 44 45 46	patients g in Nigeria : 2017		Hospital Nigeria		patients,		<\$100 =49 (59.8%) >\$101= 33 (40.2%)Married 69= (84.2%) Single 12= (14.6%) Widow 1= (1.2%)-No formal or primary education 23 (28.1%) -Secondary education 27 (32.9%) -Tertiary education 32 (39.0%)Male = 64 (78.1%) Female = 18 (22.0%)-45 =41(50.6%) >46 =40 (49.4%)		-Hospital bottlenecks - misdiagnosis - Unknown availability or cost of colonoscopy - Not serious - symptom cleared - Embarrassing - Knew the cause - Fear of unknown - No money - Religious beliefs - belief in herbal medicine
48 Determinants of 31 diagnosis of breast 49 Nigerian women: sociodemographic, 50 access and clinical Elima Jedy-Agba 20 52 53 54 55 55 56 6 57 58	breast health care factors		National Nigeria	January 2014 - July 2016	Patients		not stated Personal income yes early 23 (25.5%) late 67 (74.4%) Personal income no early 74 (35.2%) 136 (64.8%)Married: early 11 (33.6%) Late 140 (66.4%)Mone: early 5 (12.2%) late 36 (87.3%) Ories early 33 (29.2%) late 80 (70.8%) Tertiany/Post graduate (PG): early 93 (143.3%) late 84 (58.7%) Not reported early 0 (0) late 3 (100%)100% womenmean age 45.4 (SD11.4)	1 hour early 66 (36.1%) late 117 (63.9%) 1 - < 2 hours: early 15 (33.3%) late 30 (66.7%) >= 2 hours: early 5 (22.7%) late 17 (77.3%) Not reported: early 11 (22.0%) late 39 (78.0%)	-lower educational level (p=0.002); - no formal education 2.75 (95% CI 1.37, 5.52, p=0.004) -lin age-adjusted analysis, the odds of later stage were positively associated with the amount of travel time taken by the woman to reach the first healthcare provider she visited (pt=0.04) - never having heard of BC OR=2.24; 95% CI 1.25, 4.03; p=0.01 - Women who did not believe in a BC cure (OR=2.23; 95% CI 1.40, 3.56; p=0.001) - did not practice BEC (OR=1.89, 95% CI 1.20, 2.99; p=0.01) not statednot statednot stated

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Delay in presentation of cancer patients for diagnosis and management: An institutional	Uterine cervix, breast, head and neck, prostate,	Hospital Nigeria	June 2014 to May 2015	Patients	218 Questionn aire	21 to 83		-Fear of treatment side effects -Financial constraints - Inadequate facilities
report A Oladeji 2017	GIT, others							-Challenges of distance to treatment center -Lack of family support -Lack of awareness of cancer symptoms -Using food supplements -Treatment received by cancer patients at point of first presentation include spiritual care (prayers), herbal medicine -Seeking alternative therapy -Fear of diagnosis of cancer
Factors contributing to poor management outcome of sinonasal malignancies in South-west Nigeria. AJ.Fasunia 2013	Sinonasal Malignancies	Hospital Nigeria	March 2006 - February 2011	Patients	61 Questionn aire	none stated Low socioeconomic class 8.0.3% High socioeconomic class 4.9%Married 39 (63.3%) Not married 22 (36.1%)No post secondary education 40 (65.6%) With post secondary education 21 (34.4%) females 28 (45.9%) mean age 37 (ears +/ 1.9.4 (range 4 years -/ 7.2 years)	Not stated	noneNoneNone-high cost of medical treatment - patients, wrong advice - attitude of hospital staff - lack of confidence in orthodos therapy - proximity to health facility - traditional and religious belief
6 Delays in presentation and treatment of breast cancer in Enugu, Nigeria ER Ezeome 2009	Breast	Hospital Nigeria	June 1999 to May 2005	Patients	164 Questionn aire	Married 116 (71.2%) Not married 19 (11.17%) Widowed 24 (14.7%) Divorce/separated 4 (2.5%)Non 24 (15.2%) Primary 38 (24.2%) Secondary 45 (28.7%) Tertiary 47 (29.9%) Higher Degree 3 (1.8%)162 female 2 maleage range 21 - 77 yrs mean age of 45.7 yrs, median age of 45.7 yrs, median age		-wrong advice and false reassurances from the initial doctor or health professional -delays in getting biopsy or histology reports -physician's failure to get biopsy or histology at the initial evaluation -industrial actions in the hospitals -did not consider the symptoms serious or thought it will disappear -did not know the implication of the abnormality -lacked finance to go for treatment - alternative practitioners and prayer houses - did not experience pain and therefore did not present earlier
Delayed treatment of symptomatic breast cancer: The experience from Kaduna, Nigeria A. Y. Ukwenya 2008 7 8 9	Breast	Hospital Nigeria	1st July 2003 to 30 June 2005	Patients		Currently married 97 Currently unmarried Allilliterate/primary 59 Secondary/tertiary 52 Median age among those admitted for treatment within a month 50 after a month 43	^	Provider delay -Failure to refer patient at first consultation 40 (40.4%) -Attempted treatment by lumpectomy with recurrence 15(15.1%) -Lump not sent for histopathological examination 14(14.1%) -Patient not counselled about sentousness of breast lump 13(13.1%) -Breast lump mistakenly incised as an abscess 10 (10.1%) -Breast lump not fet at nitifial examination 7 (7%) -Biopsy result not immediately communicated to patient 4 (4%) -Initial biopsy diagnosis of benign disease 3(3%) Patient reasons for delay are -Family refused hospital treatment 25 (25.3%) -Did not want mastectomy as treatment 21 (21.2%) -Could not initially afford hospital treatment 13(13.1%) - Patient not aware of seriousness of a lump in the breast 47(47.5%) - Went for alternative (traditional/spiritual) treatment 38(38.4%)
1 Cancer Control at the District Hospital Level in Sub-Saharan Affica: An Educational and Resource Needs Assessment of General Practitioners. Allison N. Martin 2019	cancer type not specified (provider study)	National Rwanda	early 2017	Clinicians	aire	doctors not statednot statedfirst year general practitioners (doctors)Female 15 (21.1%) Male 56 (78.9%)20- 24 2 (2.7%) 30-34 5 (6.9%) >35 2 (2.7%)	n/a	n/an/an/a-referrals with lack of specific appointments to specialists - lack of pathology or screening services 47 (49%) - inability to afford clinic visits 48 (66%)- lack of awareness of symptoms 65 (89%)
Barriers to timely surgery for breast cancer in Rwanda 7 Lauren E. Schleimer 2019 8 9	Breast	Regional Rwanda	1st January 2014 to 31 December 2015	Patients	151 Case note	Female 144 Male 7Median age 54 (27-84)		Surgeon/operating room availability -Management of pregnancy -Inoperable, referred for second opinion -Chemotherapy toxicity -Patient refused breast surgery 4 -Patient refused breast operative treatment -Financial/social issues -Financial/social issues -Seeking traditional medicine
Delays in breast cancer presentation and diagnosis at two rural cancer referral centers in Rwanda Lydia E. Pace 2015 66 77 8 9 0 1 2 3	Breast	National Rwanda	November 2012 - February 2014	Patients	aire	not stated not stated single, widowed or divorced 73 (51%) Married 71 (49%)None or primary school 108 (75%) Secondary school or university 36 (25%) 100% femalemedian age 49 years 40 32 (22%) 40,Äi49 43 (30%) 50,Äi59 43 (30%) >60 26 (18%)		Seeking care abroad not stated - patients who visited other healthcare facilities >=5 times before diagnosis were more likely to experience system delays of >6 months (CR, 26, 95% Ct, 1.24-5.84p5.01)Patients residing in Butaro or Rwinkwavudistrict were less likely to experience long system delays (OR, 0.05; 95%Cl, 0.004-0.55; p=0.02) delay of >=6 months: -low education (odds ratio (OR), 4.88; 95% Cl 1.72-13.88; p=0.003; -seeing a traditional healer before a nurse or doctor (OR, 4.26; 95% Cl, 1.56-11.60; p=0.005);none- visited another health center or hospital first and was not referred to this hospital immediately - needed a transfer form from another facility before coming here - too expensive to travel from home to - was told by healthcare worker there was no treatment for thisease - the hospital was too far to travel to - not bothered by the problem at first - did not know I needed to see a doctor and thought it would go away - visited a traditional healer first - thought treatment might be too expensive - too busy at home or at my job - afraid it of pissibly dring if breast removed - too expensive to travel to the health center or hospital - did not know where an appropriate medical facility was - did not know where an appropriate medical facility was - did not know where an appropriate medical facility was - did not know where an appropriate medical facility was - did not twant anyone knowing had a breast problem - afraid of being examined by a doctor or other healthcare provider - had or knew someone who had a bad experience at a health center or hospital - The health center or hospital was too far - did not not that this cancer enter existed

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1 _			1					,	
	revalence of breast masses and barriers to care: Results	***Breast masses not specified if	National Rwanda	October 2011 - January 2012	Community	Sierra Leone	*women with breast masses	not stated	n/an/an/anot stated-lack of money (Sierra Leone 35.1% Rwanda 11.4%)- absence of disability associated with breast mass -lack of trust in the health care system
_ f	rom a population-based urvey in Rwanda and Sierra		Sierra Leone	,		3645 Rwanda	Sierra Leone, n=57: None 10 Home maker		-long distance required to reach the provider -stigma associated with having a breast problem
ا	eone Faustin Ntirenganya		Leone			3175	7 Domestic help 2		-consulted traditional healers instead of going to health centers
4	014					Questionn aire	Farmer 26 Self employed/small		
5							business 12 Rwanda, n=-79: None		
6							9 Home maker 0		
_							Domestic help 0 Farmer 70 Self		
7							employed/small business 0 not		
8							statednot stated*women with		
9							breast masses		
10							Sierra Leone, n=57: None 38 (66.7%)		
11							Primary 3 (5.3%) Secondary 14 (24.6%)		
13							Tertiary 2 (3.5%) Rwanda, n=79: None		
12							33(41.8%) Primary 44		
13	Consensus study on the health	Lung	Regional		clinical	27 Delphi	(55.7%) Secondary 2 oncologists		- Poor nutrition
14	ystem and patient-related arriers for lung cancer		South Africa		managers clinicians	process, nominal	pulmonologists thoracic surgeons		-Lack of smoking cessation clinics -Costs of medical treatments
15	nanagement in South Africa				public	group	pathologists		-Repeated visits for misdiagnoses for TB-patients lose faith in the health system and go to GPs
16	Vitness Mapanga 2021				health opinion	technique	radiologists oncology nurses		-Failure to come back for follow up diagnostic or treatment appointments -Patients changing their mobile numbers and then cannot be contacted or may not answer their phones from unidentified callers-fearing
					leaders NGO		medical officers NGO representatives		debt collection. -Patients endure bureaucracy at health care facilities ID, proof of residence, articulation of chief complaint
17									-Language barriers between patients and healthcare practioneers and thus difficult communications and understanding of doctor information
18									-Long delays to get appointments ,long waiting periods in clinics and long queues for high patient volumes and for diagnostic tests
19									compounded by early closing times -Primary health care is nurse driven and doctor supported-lung cancer not prioritized as a diagnosis-and not listed in the index of disease
20									conditions - Misdiagnosis linked with superficial examinations-over emphasis on more common HIV and TB pneumonia with a low index of suspicion
21									for lung cancer
									-Delays in getting diagnostic workup test results for imaging, cytology, pathology and surgery -Unwillingness for health care workers to consider a cancer diagnosis because of the inability to break bad news and/or accompany the
22									patient through the journey of care -Administration hassles-no referral forms, lack of hospital transport for referrals, obtaining informed consent, booking appointment for
23									referrals -Patient health awareness messaging within primary resources is not structured and sustained with no CHC outreach to the community
24									-Insufficient information on the prevalence of lung cancer and how best to manage it -Using sputum only to diagnose cancer
25									-Biological specimens eg pleural fluid not sent for analysis
- 11	Delay to diagnosis and breast ancer stage in an urban south	Breast	Hospital South Africa	January 2016 - February 2017	Patients	252 Questionn	Unemployed, piece work, student or	Travel to breast clinic:	lack of internet access 51 (35.9%)in early stage and 91(64.1%) in late stage) was associated with delay in acknowledging breast symptoms (p=0.051).
	frican breast clinic S Rayne			,		aire	retired -early stage 55	<30 minutes -early stage 12	-work -transport
2/	.015						(34.8%)	(30.8%)	-money
28							-locally advanced 103 (65.2%)	-locally advanced 27 (69.2%)	- low education (up to Grade 7)
29							Employed, job	30 minutes - 1 hour	- longer travel time to hospital
30							- early presentation 17 (27.0%)	-early stage 26 (35.1%)	
31							- advanced locally 46	-locally advanced 73	
31							(73.0%) Only primary school	(69.5%)	
32							-early presentation 21 (30.4%)	1 - 4 hours early stage 26	
33							-locally advanced 48 (69.6%)	(35.1%) locally advanced 48	
34							Secondary school or	(64.9%)	
35							above		
36							 early presentation 52 (34.9%) 		
							- locally advanced 97 (65.1%) <45 yrs)		
		Breast		May 2015 to June	Patients		Employed 51 (25.4%)		- surgery as first treatemnt-visiting multiple clinics-first symptom as being minor or not serious,
38	reatment - women's nathways to breast cancer		South Africa	2016		Questionn aire	Married 84 (41.8%) Single in stable		-being in denialonly seeking care when a lump increased
30	are: A cross-sectional study ennifer Moodley 2018						relationship 6 (3.0%) Single 42 (20.9%)		
40							Widowed 38 (18.9%) Divorced/separated 31		
							(15.4None-Grade 7 49		
41							(24.4%) Grade 8-Grade 11 96		
42							(47.8%) Grade 12+ 56		
43							(27.9%)Female		
44				2012		450 -	=201median age 54		Y /_
45	Access to colorectal cancer CRC) chemotherapy and the	Colorectal	Hospital South Africa	2012 - 2014	Patients	162 Case note	not stated not statednot statednot	not stated	not statednot statednot statednot statednot stated
	ssociated costs in a South African public healthcare						statedFemale 73 Male 89median 58		
40,	atient cohort Candice-lee						years		
7/		Breast	Hospital South Africa	8th January 2015 to 31st December	Patients	499 Questionn			- increase in parity OR1.10,95%CI:0.99-±1.21 -Patients aged<40years OR=1.93,95%CI:1.05-±3.58
48	vomen in Soweto, South			2016		aire	Employed 136 (27.2%) Retired 134 (26.9%)		-luminal B OR = 1.86, 95% Cl:1.10-±3.14 and -triple negative breast cancer subtypes OR=2.61,95%Cl:1.69-±5.30
49							Single 119 (24.0%)		-Clinical waiting time as a barrier n=23 (9.5%) were in early stage while 19 (7.4%) were in late stage. p-value 0.411, chi square 0.675
50							Married/co-habiting 216 (43.6%)		-Most participants 323(64.7%,166 in early stage and 157) referred themselves to CHBAH or were referred directly by a primary care clinic or a private general practitioner, by passing the secondary hospitals. Among those patients,251(77.7%, 143 early stage, 108 late stage) had
							Divorced/widowed 161 (32.4%)Completion of		only one visit prior to diagnosis. Those with more visits before reaching CHBAH were more likely to be diagnosed at a late stage(&A<0.001)49(15.2%, 18 in early stage, 31 in late stage) had 2 visits self referral /primary health facility
51							informal/primary 142 (28.5%)		->3 visits self referral /primary health facility 23 (7.1%, 5 in early stage and 18 in late stage)
52							Completion of high		East of diagnosis
53							school/any tertiary school 348		-Fear of diagnosis -Thought it was a minor ailment
54							(71.5%)Female 499<40 yrs 69 (13.8%)		- No one to look after the children -Worried no money for treatment
55							40 -49 yrs 124 (24.8%) 50-59 yrs 120 (24.1%)		·
							60-69 yrs 102 (20.4%)		
56							70 and above 84 (16.8%)		
57									
58			i		1	1	•		

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Factors relating to late presentation of patients with breast cancer in area 2 KwaZulu-Natal, South Africa Sharon R Cacala 2017	Breast	Hospital South Africa	2014	Patients	172 Other: Prospective	- employed 27% - never attended school 19% - completed high school 19% -Average education level: 6th grade women 172mean age was 56 yrs (range 23 to 100 yrs)		- financial issues - transportation issues - difficulty with the referral system and rural clinics - unaware that the lump could be cancer - did not understand severity - fear - a fraid of losing a breast - seeing a traditional healer - financial issues - transportation issues
Stage at breast cancer diagnosis and distance from diagnostic hospital in a periurban setting: A South African public hospital case series of over 1,000 women Caroline Dickens 2014 0 1 2 3 4 5 6 7	Breast	Hospital South Africa	2006 - 2012	Patients	1071 Retrospec tive cohort	not stated <5 km from hospital, n=133: <= R9600 - 29.4% <= R800 - 50.3% <5 - 9.9 km from hospital, n=299: <= R800 - 51.2% <10 - 19.9 km from hospital, n=242: <= R800 - 51.2% <10 - 19.9 km from hospital, n=242: <= R800 - 49.3% <10 - 29.9 km from hospital, n=242: <= R800 - 49.3% <10 - 29.9 km from hospital, n=188: <= R9600 - 24.7% <10 - 29.9 km from hospital, n=188: <= R9600 - 10.0% <10 - 29.9 km from hospital, n=188: <= R9600 - 27% <= R800 - 58% ont stated152 women with primary education or less <5 km from hospital n=183: 14.6%	<5 km from hospital, n=183 5 - 9 9 km from hospital, n=299 10 - 19 9 km from hospital, n=242 20 - 29 9 km from hospital, n=188 30 - 39 9 km from hospital, n=61	Not stated - older patients (RR 1.03(95% CI: 0.99, 1.07) - before 2008 (RR 1.34 (95% CI: 1.17, 1.53) - living 30-39km from hospital (95% CI: 11, 75) Not statedNot statedNot statedNot stated
Predictors of cervical cancer being at an advanced stage at diagnosis in Sudan Ahmed 0 lbrahim 2011 1 2 3	cervical cancer	Hospital Sudan	1 January 2007 to December 2007	Patients	197 Retrospec tive cohort	not stated not stated Single 60 (30.5%) Married 137 (69.5%)Basic school 122 (61.9%) Secondary school 75 (38.1%)100% female<=54 73 (37.1%) >=55 124 (62.9%)	not stated	not statedolder (>= 55 years) (OR: 1.03, 95% CI: 1.01-1.05) Rural residence (OR: 1.13, 95% CI: 1.78-5.50) African ethnicity (OR: 1.76, 95% CI: 1.01-3.05) without health insurance (OR: 7.7, 95% CI: 3.76-15.38)not statednot statednot stated
Educational Opportunities for Down-Staging Breast Cancer in Low-Income Countries: an 5 Example from Tanzania Kristen Yang 2019	Breast	Hospital Tanzania	January 2016 - August 2018	Patients	196 Questionn aire	not stated not statednot statednot statednot statedmean age early: 51.5 +/- 10.3 late: 51.6 +/- 12.9	not stated	not stated - never had a routine breast exam conducted prior to their diagnosis (OR = 4.40; 95% CI = 2.09-9.25) not stated-of stated-financial restraints - time restraints not stated
8 Patient and disease characteristics associated with late tumour stage at presentation of cervical cancer in northwestern Tanzania Ramadhani Mlange 2016 1 2 3 4 5 6 6 7 8	Cervical	Hospital Tanzania	November 2013 - April 2014	Patients	202 Questionn aire	Peasant 170 (84.1%) Petty trader 20 (9.9%) Business 2 (0.9%) Business 2 (0.9%) Employed 5 (2.4%) Outhern 20 (2.4%) Separated 39 (19.3%) Windowed 34 (16.8%) Formal 87 (43.1%) None formal (115 (56.9%)100% Femalemean 50.5 +/-13.3 years (25-80 years) <40 45 (22.2%) 40-59 101 (50.0%) >60 56 (27.7%)	not stated	not stated -Lack of formal education, OR=2.1, 95% CI 1.2 - 3.8, p=0.012 -lack of health insurance, OR=3.9, 95% CI 1.1-13.3, p=0.033 -three or more pre-referral visits OR=1.9, 95% CI 1.1-3.5, p=0.034 - attending to traditional health practitioners OR = 2.3 [95 %CI 1.2-4.2], p= 0.011 -lack of personal initiative to attend health care facility OR = 2.0 [95 % CI 1.0-3.8], p= 0.028) not statedSeeking alternative-health practitioners ack of personal initiative
Engagement in HIV Care and Access to Cancer Treatment Among Patients With HIV-Associated Malignancies in Uganda. Daniel H. Low 2019	HIV associated malignancies: ISS (46%) servical cancer (19%) ecevical cancer (10%) breast cancer (10%) head and neck cancer (5%) non-Hodgkin lymphoma (4%) vulvovaginal cancer (4%) others (6%)	Hospital Uganda	October 2015 - January 2016	Patients	100 Questionn aire	Employed 34, n=100 not statednot statedn-102 Poor literacy 32 Incomplete primary school 36 Complete primary school 18 Some secondary school 30 Complete secondary school 16 Female 52% Male 48% median 41 years	?n=104 < 25 km 24 25-49 km 23 50-99 km 12 >100 km 55	diagnostic delay (44V117 days for those not receiving HIV care;P=.048)- travel to multiple clinics/hospitals (n = 18, 46%), conflicts between appointments for HIV and cancer care (n = 9, 23%) treatment costs (n = 8; 13%) difficulty adhering to the quantity of medications (n = 6, 15%) difficulty adhering to the quantity of medications (n = 6, 15%) stigma - Reporting any barrier to care at follow-up was associated with having prematurely withdrawn from cancer care (36%v0%; 95%C), 21% to 53%; relative risk not calculable;P=.003 - Distance from place of residence to the UCI was not associated with reporting of a barrier to care; however, those who prematurely withdrawn from cancer care at 10 care and 10 care at 21 care at 22 car
Social, demographic and healthcare factors associated with stage at diagnosis of cervical cancer: cross-sectional study in a tertirary hospital in Northern Uganda. Amos Deogratius Mwaka 2015	Cervical	Hospital Uganda	September 2012 to April 2014	Patients	149 Questionn aire	Housewife/peasant 132 (88.6%) Petty trader 10 (6.7%) Formally employed 4 (2.7%) Missing 3 (2.0%) not statedMarried 84 (56.4%) Divorced 21 (14.1%) Widowed 44 (29.5%) No formal education 67 (45.0%) Primary education 7 (4.3%) Secondary education 7 (4.7%) Tertiary education 2 (1.3%) Missing 1 (0.7%)100% Femalemean age 48 +/- 13 years	E40 km 41 (27.5%) 40-80 km 35 (23.5%) 81-100 km 13 (8.7%) 101-375 km 58 (38.9%)	the odds of advanced stage cancer among patients who self-reported financial difficulty are 5.7 times (95% CI 1.8to 20.64) the odds of advanced cancer among the patients who did not report financial difficulty as areason for non-prompt health seeking-the CR of advanced stage cervical cancer among patients who perceived their symptoms as due to a serious file. Self-self-self-self-self-self-self-self-s

1									
2	Challenges faced by cancer patients in Uganda:	Cervix 72 (20%) Kaposi's sarcoma	Hospital Uganda	April to May 2017	Patients	359 Questionn	Self Employed 87 (24%)		-lack of money for treatment, medicines and transportationfamily responsibilities
2	Implications for health systems	71 (20%)	ogunda			aire	Unemployed 82 (23%)		-not healthy enough to continue treatment
3		Breast 46 (13%) Prostate 19 (5%)					Stopped working due to cancer 70 (20%)		-failure to find accommodation in Kampalalack of money for transportationfamily responsibilities
4	Nakaganda 2020	Esophagus 16					Casual employment 61		ranniy responsionities
•		(4%)					(17%) Formal employment		-lack of money for transportationfamily responsibilities
5							39 (11%)		riannily responsibilities
6							Other 20 (6%) - Married 143 (43%)		
7							Single 77 (21%)		
/							Living together 61 (17%)		
8							Separated/divorced 47		
9							(13%) Widow/Widower 31		
							(9%)Primary level 147		
10							(41%) Secondary level 97		
11							(27%)		
10							College/University education level 71		
12							(20%)female 199		
13	Surgical candidacy and	cervical	Hospital	April 2017 -	Patients	268	(55%) average age 43 Industry/business 92	> 15 km 181	The statistics were executed to reflect chance of receiving treatment rather than delay - see comment boxnot statednot stated-financial
14	treatment initiation among			September 2018		Questionn	farming/domestic 175	<= 15 km 86	constraints, including lack of funds to pay for travel and the nominal fees associated with radiation, surgery and diagnostic tests (69%)
1.5	women with cervical cancer at public referral hospitals in					aire	not statedMarried 121 Single/divorced/		- long wait times (30%)not statednot stated
15	Kampala, Uganda: A						widowed 146Less than		
16	descriptive cohort study Megan Swanson 2020						primary 110 Higher than primary		
17							151100% Female>=50		
							years 123 ,50 years 133		
18	Prognosis and delay of	Kaposi sarcoma	Hospital	June to October	Patients	161	<100,000 UGSH =90		- paid out of pocket tests or chemotherapy, 68 (42.2% p value 0.001) - visitation to a traditional healer was associated with experiencing
19	diagnosis among Kaposi's			2012		Other:	(58.1%) 100K - 500K UGSH=59		diagnostic delay (OR2.69, p = 0.020, 95% Cl: 1.17-6.17)visited a traditional healer 41(25.5% p value 0.872)
20	sarcoma patients in Uganda: A cross-sectional study					case notes and			-Lack of money for transportation - Distance to UCI
	Christopher De Boer 2014					standardi zed	>500,000 UGSH =6 (3.9%)Primary		-Lack of money for transportation - Distance to UCI
21						interview	83(51.6%)		* Distance to OCI
22					•	s	Secondary 58 (36.0%) Tertiary or degree 20		
23							(12.4%)Male 111		
							=(68.9%) Female 50=		
24							(31.1%)<30 =44		
25							(28.0%) 31-40 =85 (54.1%)		
26							>40 =28 (17.8%)		
	Inequities in breast cancer	Breast	Hospital	September 2014 -	Patients	1335	Unskilled jobs 923	Not stated	- BMI p=0.023
27	treatment in sub-Saharan Africa: Findings from a		Uganda Nigeria	'early' 2016		Other: Prospectiv	(70%) - not treated 172		< 18.5 1.58 (0.70 to 3.59) AND 1.83 (0.79 to 4.21) 30+ 1.76 (1.10 to 2.81) AND 1.53 (0.95 to 2.47)
28	prospective multi-country		Namibia			e multi-	(18.8%) treated 751		- Belief in spiritual healing p=0.004
29	observational study Milena Foerster 2019					centric	(81.2%) Skilled 503 (30%)		Yes 1.18 (0.83 to 1.68) 1.21 (0.84 to 1.21) not statednot stated- cost - personal decision e.g (lack of belief in effectiveness, fear or non compliance to or rejection of therapy) not statednot stated
							- not treated 55		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
30							(13.8%) treated 348 (86.2%) Not statedNot		
31							statedNot stated100%		
32							femalemean age 50.7 (SD = 13.6)		
	Dissecting the journey to	Breast	Hospital	September 2014 -	Patients	1429	Unskilled 1007	Not stated	-Age IRR 1.26 (0.89-1.79)
33	breast cancer diagnosis in sub-		Uganda, Zambia,	September 2017		Other: Interview	(70.5%) Skilled 242 (29.5%)		-Low SEP IRR 1.10 (0.93-1.30) -Not married (only for Namibia, p<0.001) IRR 2.63 (1.22-5.64) and 1.28 (0.90-1.80) non blacks and blacks
34	Saharan Africa: Findings from the multicountry ABC-DO		Namibia,			s	Low SEP 810 (56.7%)		- Primary/no education IRR 1.16 (0.98-1.37), (not for Namibia non black p=0.037)
	cohort study Milena Foerster		Nigeria				medium/high SEP 439 (43.3%)Not married	•	-Unskilled labour IRR 1.22 (1.01-1.47) -Belief in traditional medicine IRR 1.03 (0.87-1.22), (only for Nigeria and Zambia, p=0.007)
35	2020						710 (49.7%)		-Recent birth IRR 1.08 (0.84-1.38)
36							Married 539 (50.3%)Primary/no		-HIV positive (only for Namibia-blacks and Zambia, p=0.022) IRR 1.11 (0.70-1.76) and 2.12 (0.97-4.62) respectively -First symptom lump IRR 1.42 (1.14-1.76)-told not to worry
37	1						education 628 (44.0%)		-wrong diagnosis-lack of transport
20							Secondary/higher 801 (56%)100%		-transport costs-pain -fear
36							femalemean 50.1		
39	1								
40									
41									
	Health system constraints	cervical	Regional	January to April	Patients	212:	female patients 134	Distance from	Women:
	affecting treatment and care among women with cervical		Zimbabwe	2018	and clinicians	-patients 134	male hcw 15 female hcw 63	nearest cervical cancer screening	-inability to see specialist - less access to regular general practitioners
43	cancer in Harare, Zimbabwe O.					- health	patients mean age	health facility	- paying out of pocket for health services
	Tapeta 2015					workers 78 Other:	50.2 untreated cervical cancer and 52.9 for	<10 km untreated 5 (12%)	Health care workers -inadequate training of HCW for cervical cancer treatment and care.
44	1					questionn	those with treated	treated 30 (33%)	- not knowing or having read both the National Cancer Prevention and Control Strategy (2013-2017) and the Cervical Cancer Prevention and
		1	ı	1	1	aire, IDI, FGD	cancer health workers mean	11-50km untreated 4 (10%)	Control Strategy for Zimbabwe (2016-2020) -not enough health professionals to meet the demand of services in health facilities
45									
45							age 37.3 yrs	treated 18 (19%)	-weak surveillance system for cervical cancer
45 46							age 37.3 yrs	> 50km untreated 1 (2%)	-unavailability of back-up for major equipment- didn't know estimated distances from their residence to the nearest cervical cancer screening
45							age 37.3 yrs	> 50km untreated 1 (2%) treated =7 (8%)	-unavailability of back-up for major equipment- didn't know estimated distances from their residence to the nearest cervical cancer screening -lack of finances Financial challenges
45 46							age 37.3 yrs	> 50km untreated 1 (2%) treated =7 (8%) Don't know untreated 32 (76%)	-unavailability of back-up for major equipment- didn't know estimated distances from their residence to the nearest cervical cancer screening
45 46 47							age 37.3 yrs	> 50km untreated 1 (2%) treated =7 (8%) Don't know	-unavailability of back-up for major equipment- didn't know estimated distances from their residence to the nearest cervical cancer screening -lack of finances Financial challenges

Table 1. Exposure-Outcor	me relationship for cohort s	tudies
Author	Exposure	Outcome
Cacala 2017	Breast Cancer pathway	Late presentation of
	to diagnosis (symptom	Breast Cancer (T-stage)
	appraisal to presentation	
	to clinic)	
De Boer 2014	Kaposi's Sarcoma	Delay in diagnosis of
	pathway to diagnosis	Kaposi's Sarcoma (Poor
		outcomes)
Dickens 2014	Distance from diagnostic	Stage of breast cancer at
	hospital to treatment	diagnosis
	center	
Foerster 2019	Breast Cancer Pathway	Receipt of treatment
	to treatment	
Gebremariam 2021	Breast Cancer Care	Time to initiation of
	pathway to	chemotherapy
	chemotherapy	
Ibrahim 2011	Cervical cancer pathway	Advanced stage disease
	to diagnosis (symptom	
	appraisal to presentation	
	to clinic)	
Jedy-Agba 2017	Breats Cancer Pathway	Stage at diagnosis
	to diagnosis	
Knapp 2020	Geospatial access	Cancer stage at
		diagnosis
Martei 2019	Chemotherapy stock out	Suboptimal therapy
		delivery
Page 2019	Positive HPV test	Acceptance and
		adherence to diagnostic
		procedure and treatment
Schleimer 2019	Pathway from diagnosis	Delay to appropriate
	to surgery	operative treatment
Tesfaw 2020	Breast Cancer diagnostic	Advanced stage of
	pathway; patient	cancer at diagnosis
	delay>3 months	
Zeleke 2021	Cervical Cancer	Stage IIIA-IVB
	Diagnostic pathway	presentation



PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
6 TITLE			
7 Title	1	Identify the report as a systematic review.	1
8 ABSTRACT			
9 Abstract	2	See the PRISMA 2020 for Abstracts checklist.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	4
13 Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	5,6
14 METHODS	1 1		
15 Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	6
16 Information17 sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to identify studies. Specify the date when each source was last searched or consulted.	6
18 Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used.	Appendix 1
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	6
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each report, whether they worked independently, any processes for obtaining or confirming data from study investigators, and if applicable, details of automation tools used in the process.	6
25 Data items 26	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with each outcome domain in each study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which results to collect.	Appendix 2
27 28	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, funding sources). Describe any assumptions made about any missing or unclear information.	Appendix 2
29 Study risk of bias 30 assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	6,7,8 Figure 3
31 Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Appendix 2
32 Synthesis 33 methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	n/a
34 35	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	n/a
36	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	n/a
37 38 30	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	n/a
39 40	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analysis, meta-regression).	n/a
41	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	n/a
42 Reporting bias 43 assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases).	6,7,8 Figure 3
44 Certainty 45 assessment 46	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome for peer review only intro://bm/open.bm/.com/site/about/guidelines.xhtml	n/a

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PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where item is reported
RESULTS			
Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the number of studies included in the review, ideally using a flow diagram.	7
	16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they were excluded.	Figure 2
Study characteristics	17	Cite each included study and present its characteristics.	7, Appendix 2
Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Figure 3
Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) an effect estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Appendix 2
Results of	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	n/a
syntheses	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	n/a
	20c	Present results of all investigations of possible causes of heterogeneity among study results.	n/a
	20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	n/a
Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Figure 3
Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	n/a
DISCUSSION			
Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	16,17,18
	23b	Discuss any limitations of the evidence included in the review.	18
	23c	Discuss any limitations of the review processes used.	n/a
	23d	Discuss implications of the results for practice, policy, and future research.	18
OTHER INFORMA	TION		
Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	n/a
protocor	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	Notprepared
	24c	Describe and explain any amendments to information provided at registration or in the protocol.	n/a
Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the review.	19
Competing interests	26	Declare any competing interests of review authors.	19
Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	19

44 From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71

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